User's Manual

IMO Programmable Monitoring Unit

PMU SERIES

Communication and Interface

IMO Precision Controls

- **When using IMO equipment, thoroughly read this manual and associated manuals Also pay careful attention to safety and handle the module properly.**
- **Store this manual in a safe place so that you can take it out and read it whenever necessary.**

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CONTENTS

1. **Abstract** 6

1.1 PMU Communication Interface Feature 6

1.2 Communication Interface Protocol 7

1.2.1 Serial Interface(RS-232C) 7

1.2.2 Serial Interface(RS-422/485) 8

1.3 PMU Communication Setup 9

2. **Serial Master Communication Type** 11

2.1 IMO K-Series Series 14

2.1.1 K-Series Serial Interface 14

2.1.2 K-Series CPU Direct Interface 17

2.1.3 Available Address List 19

2.2 IMO G-SERIES GM GM/New K-Series 20

2.2.1 G-SERIES GM GM/New K-Series Cnet Serial Interface 20

2.2.2 G-SERIES GM/New K-Series CPU Direct 28

2.2.3 Available Address List 31

2.3 Mitsubishi MELSEC Series 33

2.3.1 AnN, AnS, A0J2, AOJ2H, AnA, AnU, FX Interface 33

2.3.2 System Configuration 33

2.3.3 Melsec Q series Interface 46

2.3.4 MELSEC CPU Direct 52

2.3.5 MELSEC- Q Series CPU Direct 55

2.3.6 Available Address List 57

2.4 Fuji Micrex-F Series 61

2.4.1 Micrex-F Serial Interface 61

2.4.2 System Configuration 61

2.4.3 Available Address List 68

2.5 Samsung FARA / NAiS Series 69

2.5.1 FARA-N70α/700/700α/7000 PLC Serial Interface 69

2.5.2 FARA-N70α/700/700α/7000, NAiS PLC CPU Direct 72

2.5.3 FARA-N70Plus/700Plus PLC CPU Direct 76

2.5.4 Available Address List 79

2.6 OMRON SYSMAC Series 80

2.6.1 OMRON SYSMAC-C Serial Interface 80

2.6.2 OMRON CPM1A / 2A Serial Interface 92
2.6.3 Available Address List 97

2.7 Allen-Bradley PLC 99
2.7.1 SLC500 PLC CPU Direct 99
2.7.2 PLC-5 PLC CPU Direct 104
2.7.3 Available Address List 107

2.8 Modicon Series 109
2.8.1 Modicon Modbus Serial Interface 109
2.8.2 Available Address List 112

2.9 Samsung SPC Series 113
2.9.1 SPC Series PLC CPU Direct 113
2.9.2 Available Address List 116

2.10 Siemens S5/S7 Series 117
2.10.1 S5/ S7 Serial Interface 117
2.10.2 S7-300/400 (CPU Direct Using MPI Port) 121
2.10.3 S7-200 (CPU Direct Using PPI Port) 124

2.11 GE Fanuc 90-30/90-70 Series 127
2.11.1 GE Fanuc 90-30(SNP/SNP-X) PLC CPU Direct 127
2.11.2 GE Fanuc 90-70(SNP-X) PLC Serial Interface 130
2.11.3 Available Address List 133

2.12 Compile Technology Tiny PLC Series 134
2.12.1 Tiny PLC CPU Direct 134
2.12.2 Available Address List 137

2.13 Toshiba Prosec-T Series 138
2.13.1 Toshiba Prosec-T Series Serial Interface 138
2.13.2 Available Address List 142

2.14 KOYO PLC Series 143
2.14.1 KOYO PLC CPU Direct 143
2.14.2 Available Address List 145

2.15 SAIA PCD Series 146
2.15.1 SAIA PCD CPU Direct 146
2.15.2 SAIA PCD Serial Interface 147

2.16 FATEK FACON Series 150
2.16.1 FATEK FACON Series interface 150
2.16.2 Available Address List 153

2.17 HITACHI MICRO EH Series 154
2.17.1 HITACHI MICRO EH Series Interface 154
2.17.2 System Configuration 154
2.17.3 Available Address List 159

2.18 DELTA DVP Series 160
2.18.1 DELTA DVP-ES Serial Interface 160
2.18.2 System Configuration 160
2.18.3 Available Address List 163

3. Interface of measurements and Controller 164

3.1 RKC SR-Mini Series 164
3.1.1 RKC SR-Mini Series interface 164
3.1.2 System Configuration 164
3.1.3 Available address list 167

3.2 UX100/NX/PX Series 170
3.2.1 UX100/NX/PX Series Interface 170
3.2.2 System Configuration 170
3.2.3 Available address list 173

3.3 CERSA-MCI LSN 174
3.3.1 CERSA-MCI LSN interface 174
3.3.2 System Configuration 174
3.3.3 Available Device List 180

3.4 AND WEIGHING INDICATOR Series 181
3.4.1 AND WEIGHING INDICATOR Interface 181
3.4.2 System Configuration 181
3.4.3 Available Address List 184

4. Interface of Inverters and motion controllers 185

4.1 MELSEC FX2N-20GM 185
4.1.1 MELSEC FX2N-20GM Interface 185
4.1.2 System Configuration 185
4.1.3 Available Address List 187

4.2 ABB INVERTER ACS140/400 Series 188
4.2.1 ABB INVERTER ACS140/400 Series interface 188
4.2.2 System Configuration 188
4.2.3 Available Address List 192

4.3 IMO VXM/VXSM INVERTER Series 194

4.3.1 IMO VXM/VXSM INVERTER Series Interface 194
4.3.2 System Configuration 194
4.3.3 Available Function List 197
4.4 LG Inverter SV-iG5 198
4.4.1 LG SV-iG5 SERIES Interface 198
4.4.2 System Configuration 198
4.4.3 Available Address List 200
4.5 Supermizer HJMX Controller 201
4.5.1 Supermizer HJMX Controller interface 201
4.5.2 System Configuration 201
4.5.3 Available Address List 204
4.6 ROBOSTAR NewRo RCM 205
4.6.1 ROBOSTAR NewRo RCM Interface 205
4.6.2 System Configuration 205
4.6.3 Available Address List 208
4.7 PMAC Series 211
4.7.1 PMAC Series Interface 211
4.7.2 System Configuration 211
4.7.3 Available Address List 215
4.8 GIDDINGS & LEWIS MMC 216
4.8.1 GIDDINGS & LEWIS MMC Interface 216
4.8.2 System Configuration 216
4.8.3 Available Address List 219
5. N:1 Communication (Multi-Link) 220
5.1 Basic of N:1 Communication (Multi-Link) 220
5.2 Characteristics of N:1 (Multi-Link) 220
5.3 Connection diagram of multi-link communication 221
5.4 Operation of N : 1 communication(Multi-Link) 222
5.4.1 Flow chart of multi-link operation 222
5.4.2 Operating procedure of Multi-Link communication 222
5.5 Setup communication parameters for Multi-Link 223
6. 2 Way Communication using COM 1 and COM 2 port 226
6.1 General 226
6.2 Serial Port of PMU 226

6.3 Cable connection for 2 way communication 226
6.3.1 Cable connection to PLC or controller using COM 2 port 226
6.3.2 Cable connection to PLC or controller using COM 1 port 227
6.4 Connectable PLC list using COM 1 port 227
7. Serial Slave Communication Protocol 229
7.1 SLAVE Protocol Description 230
7.1.1 READ Command 231
7.1.2 Response Command(ACK) for READ 231
7.1.3 Write Command 232
7.1.4 Response Command(ACK) for WRITE 232
7.1.5 Cable Diagram 233
7.1.6 PMU Setup 233
7.1.7 Communication Programming Example 234
7.2 SLAVE Extended 2 239
7.2.1 METHODS OF COMMUNICATION 239
7.2.2 Memory Table Batch Reading(in word) 240
8. IMO Dedicated Communication Protocol 245
8.1 Fnet Protocol Description 245
8.1.1 Cable connection 245
8.1.2 PMU parameter setup 245
8.2 Rnet Protocol Description 247
8.2.1 Cable connection 247
8.2.2 PMU parameter setup 247

1. Abstract

1.1 PMU Communication Interface Feature

PMU has data indication function and operating function replacing operation panel including complex switch buttons and indication lamps, and also have many kinds of communication interface to external controllers for CIM configuration.
Communication interface features of PMU are as follows.

① Support standard serial interface RS-232C/422/485.
② Support communication master function to read and write external controller's memory data by using controller's fixed communication protocol through standard serial interface.
③ And also provide **Slave Protocol** for serial interface to embedded system and Personal computer.

1.2 Communication Interface Protocol

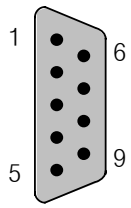
1.2.1 Serial Interface(RS-232C)

(1) Use it in all PMU model.

(2) Protocol

No.	Item	Contents	
1	Communication Type	Half Duplex	
2	Transmission Control Mode	Asynchronous	
3	Transmission Length	About 15m	
4	Connection Type	1:1	
5	Transmission Code	HEX(ACSII)	
6	Baud Rate	9600, 19200, 38400 bps	
7	Data Type	Data	7, 8 bit
		Parity	None, Odd, Even
		Stop Bit	1, 2

(3) Connector pin arrangement and signal

Figure	Pin No.	Signal	Direction	Contents
9Pin Female	1	NU		
	2	RD(RxD)	Input	Receive Data
	3	SD(TxD)	Output	Send Data
	4	DTR	Output	Data Terminal Ready
	5	SG		Signal Ground
	6	DSR	Input	Data Set Ready
	7	RTS	output	Send Request Signal
	8	CTS	Input	Send Enable Signal
	9	NU		

NU: Not Used

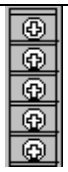
1.2.2 Serial Interface(RS-422/485)

(1) Use it in all PMU model.

(2) Protocol

No.	Item	Contents	
1	Communication Type	Half Duplex, 5line	
2	Transmission Control Mode	Asynchronous	
3	Transmission Length	About 500m	
4	Connection Type	1:1	
5	Transmission Code	HEX(ACSII)	
6	Baud Rate	9600, 19200, 38400, 57600, 115200 bps	
7	Data Type	Data	7, 8 bit
		Parity	None, Odd, Even
		Stop Bit	1, 2

(3) Connector pin arrangement and signal

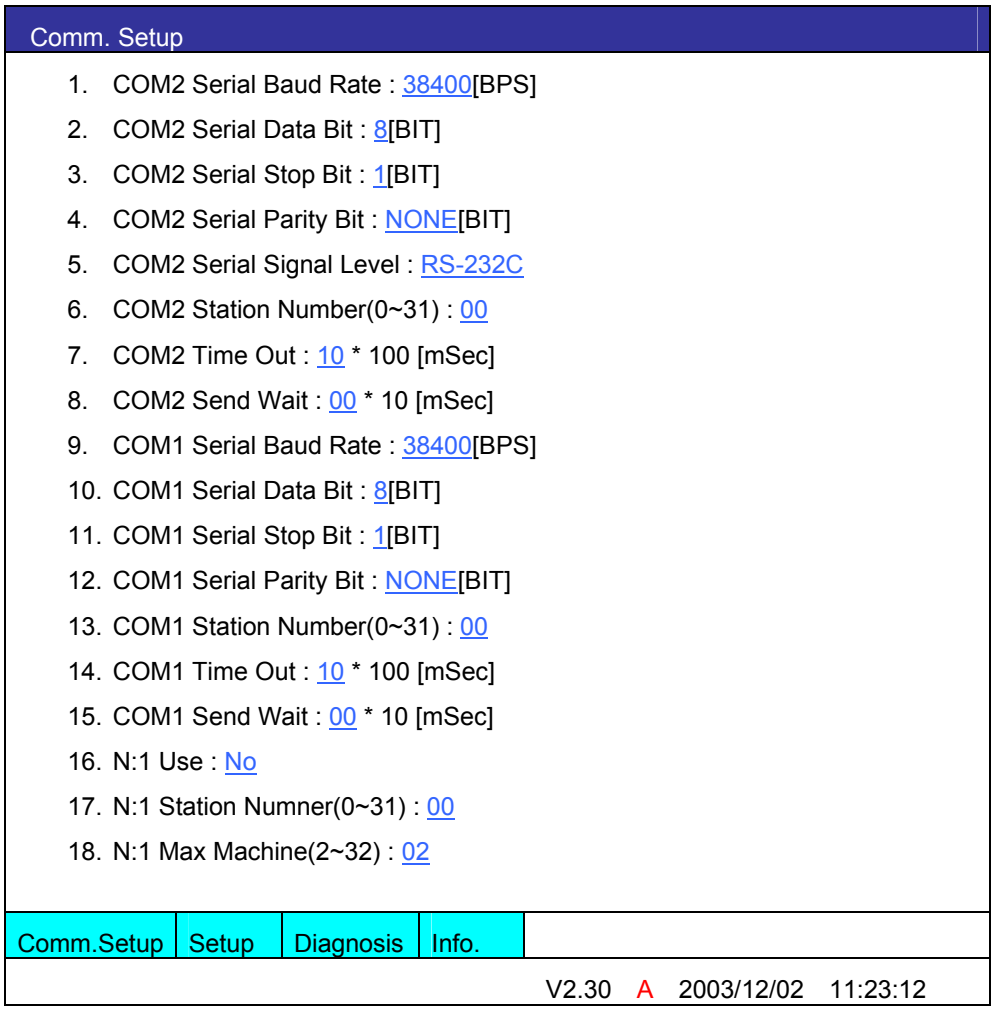
Figure	Pin No.	Signal	Direction	Contents
5Pin Terminal Block	1	RDA(RD+)	Input	Receive Data(+)
	2	RDB(RD-)	Input	Receive Data(-)
	3	SDA(SD+)	Output	Send Data(+)
	4	SDB(SD-)	Output	Send Data(-)
	5	SG		Signal Ground

1.3 PMU Communication Setup

Describe serial interface setup items in PMU.

① Push [Comm. Setup] Menu.

② Setup parameters of [Serial Baud Rate], [Serial Data Bit] and etc.


Comm. Setup
1. COM2 Serial Baud Rate : 38400[BPS]
2. COM2 Serial Data Bit : 8[BIT]
3. COM2 Serial Stop Bit : 1[BIT]
4. COM2 Serial Parity Bit : NONE[BIT]
5. COM2 Serial Signal Level : RS-232C
6. COM2 Station Number(0~31) : 00
7. COM2 Time Out : 10 * 100 [mSec]
8. COM2 Send Wait : 00 * 10 [mSec]
9. COM1 Serial Baud Rate : 38400[BPS]
10. COM1 Serial Data Bit : 8[BIT]
11. COM1 Serial Stop Bit : 1[BIT]
12. COM1 Serial Parity Bit : NONE[BIT]
13. COM1 Station Number(0~31) : 00
14. COM1 Time Out : 10 * 100 [mSec]
15. COM1 Send Wait : 00 * 10 [mSec]
16. N:1 Use : No
17. N:1 Station Numner(0~31) : 00
18. N:1 Max Machine(2~32) : 02
Comm.Setup
Setup
Diagnosis
Info.
V2.30 A 2003/12/02 11:23:12

③ Parameters for serial interface are as follows.

Item	Selectable Contents	Ref.
Baud Rate	9600, 19200, 38400, 57600, 115200 bps	
Data Bit	7 bit, 8 bit	
Stop Bit	1 bit, 2 bit	
Parity Bit	NONE, EVEN, ODD	
Signal Level	RS-232C, RS-422	
Controller Station No. at Communication Diagnosis	00 ~ 31	Setup station no. of controller
Timeout	1~99	

Please refer transmission part of manual for how to connect and download between PC and PMU.

2. Serial Master Communication Type

Following controllers are connectable to PMU by serial interface now.

Even though controllers are not listed, and if they can support serial interface, it is possible to connect to PMU by our open slave protocol.

Controller	Type	Connection Module	Ref.
K-Series	K10/30/60/100S	Option Module	Serial(RS-485)
	K10/30/60/100S	CPU Direct	Serial
	K10S1	CPU Direct	Serial
	K60H,K200H	CPU Direct	Serial
MELSEC (Melsec)	A0J2, AOJ2H	A0J2C214	Serial
		CPU Direct	Serial
	AnN	AJ71C24-S8	Serial
		CPU Direct	Serial
	A1SH/A2SH	A1SJ71C24-R2	Serial
		CPU Direct	Serial
	A2USH/A2USH-S1	A1SJ71UC24-R2	Serial
		CPU Direct	Serial
	AnA	AJ71UC24	Serial
		CPU Direct	Serial
	AnU	AJ71UC24	Serial
		CPU Direct	Serial
	QnA	AJ71UC24 AJ71QC24	Serial
		CPU Direct	Serial
	FX	FX2N-232-BD FX2N-422-BD	Serial
		CPU Direct	Serial
	Q	QJ71C24 QJ71C24-R2	Serial
		CPU Direct	Serial
G-Series GM	GM1~GM3	G3L-CUEA	Serial

		CPU Direct	Serial
	GM6, GM7	G7L-CUEB	Serial
		CPU Direct	Serial
NEW K-SERIES	1000S	K7F-CUEA	Serial
		CPU Direct	Serial
	300S	K4F-CUEA	Serial
		CPU Direct	Serial
	200S	K3F-CU2A	Serial
		CPU Direct	Serial
	80S (K7)	G7LCUEB G7LCUEC	Serial
		CPU Direct	Serial
Micrex-F	F80H,F120H, F120S,F140S, F150S	FFU120B, FFK120A	Serial
OMRON	C200H/C200HS	C200H-LK202-V1	Serial (RS-422)
		C200H-LK201-V1	Serial (RS-232C)
	C500/C1000H/ C2000H/C500F	C500-LK201-V1/ C500-LK203	Serial (RS-232C/ RS-422)
	C50/C120/C500/C200H/C1000H/C2000H/C120F/C500F/CS1	C120-LK201-V1	Serial (RS-232C)
		C120-LK202-V1	Serial (RS-422)
FARA	FARA-N70/700 α	CCU	Serial
		CPU Direct	Serial
	FARA-N70/700PLUS	CPU Direct	Serial
AB	SLC500[5/03,04]	CPU Direct	Serial
	PLC-5	CPU Direct	Serial
Modicon	884/984	Modbus	Serial
SPC	SPC-10 SPC-24S SPC-100 SPC-120S SPC-300	CPU Direct	Serial

Siemens	S7-200PPI (CPU212/214)	CPU Direct	Serial (RS-422)
	S7-MPI	CPU Direct	Serial (RS-232C)
	S7-300	CP340	Serial
	S7-400	CP441-2	Serial
GE FANUC 90-30	CPU311/CPU331	CPU Direct	Serial (RS-422)
GE FANUC 90-70	CPU731/732/771/ 772/781/782	IC697CMM711	Serial
YASKAWA	PROGIC-8 MP-920 CP-9200SH (CP-217)	CPU Direct	Serial (RS-232C)
Toshiba	Prosec-T (T3,T3H,T2N, T2E)	CPU LINK	Serial (RS-232C)
		CPU Direct	Serial (RS-232C)
Comfile Technology	Tiny PLC (TCP32/37)	CPU Direct	Serial (RS-232C)
Koyo	DL-205 DL-305 DL-405	Direct Net	Serial (RS-232C)
POSCON	POSFA phld-1a/2a	PHLD-1A PHLD-2A	Serial
		CPU Direct	Serial
SAIA	PCD2	F110 F120	Serial
		CPU Direct	Serial

'CPU Direct' means serial communication through loader port of controller's CPU module.

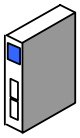
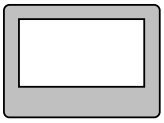
2.1 IMO K-Series Series

2.1.1 K-Series Serial Interface

The following section describes the system configuration and interface between IMO K-Series PLC and PMU by serial RS-232C/485.

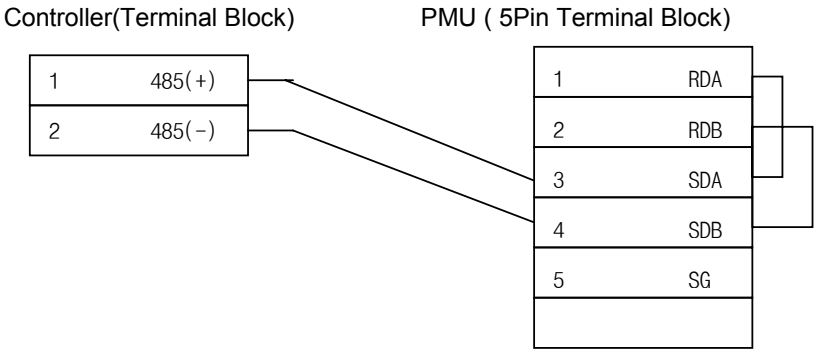
2.1.1.1 System Configuration

This figure shows system configuration to connect IMO K-Series PLC to PMU.

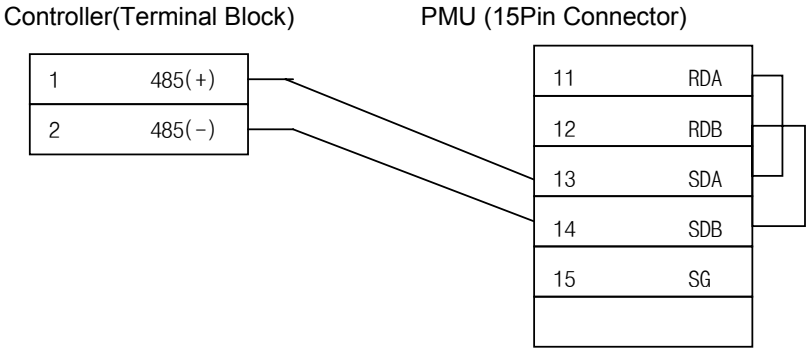
Controller	Comm. Module	Cable	PMU
			
K10S1, K10S, K100S	None	Refer to Connection Diagram(RS-485)	All PMU
K30S,K60S	Option Module	Refer to Connection Diagram(RS-485)	

2.1.1.2 Cable Diagram

(1) RS-485 Connection Diagram(K10S1,K10S,K30S,K60S,K100S ↔ PMU (for 5Pin Terminal Block))

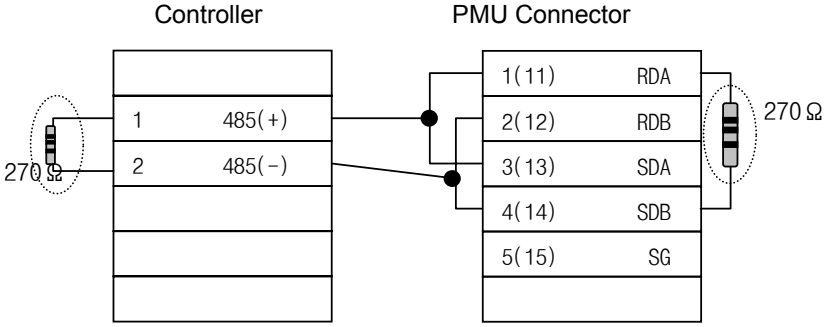


(2) RS-485 Connection Diagram(K10S1,K10S,K30S,K60S,K100S ↔ PMU(for 15 Pin Connector))



Caution

In case of RS-485 connection, you have to connect resister at each terminal as follows for noise reduction.



2.1.1.3 K-Series PLC Setup

(1) K10S1,K10S,K30S,K60S,K100S Setup

Above PLCs are setup by special Loader or KGLWIN program. Setup items are as follows.

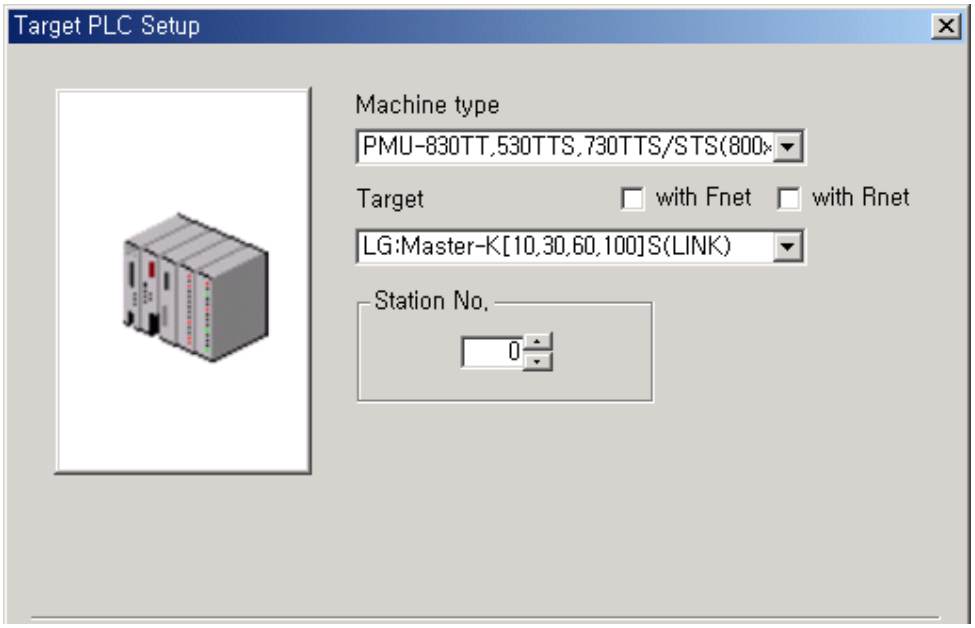
- Station No. : 0 ~ 31
- Baud Rate : 300 ~ 19200bps

In case of RS-485, do not setup 1FH(31) as PLC station no.

2.1.1.4 PMU Setup

(1) PMU Editor Setup

Setup Controller type as K[10,30,60,100]S (LINK) in “K-Series Series”



(2) Serial setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

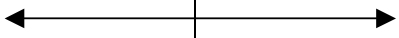
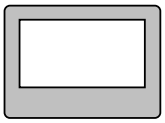
- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : 8bit(Fixed)
- Serial Stop Bit : 1bit(Fixed)
- Serial Parity Bit : None(Fixed)
- Serial Signal Level: Same as controller’s setup
- Station No. at Communication Diagnosis(0~31) : Same as controller’s setup

2.1.2 K-Series CPU Direct Interface

The following section describes the system configuration and interface between K-Series PLC (K10S, K30S, K60S, K100S, K10S1, K60H, K200H) and PMU using Loader port of CPU module.

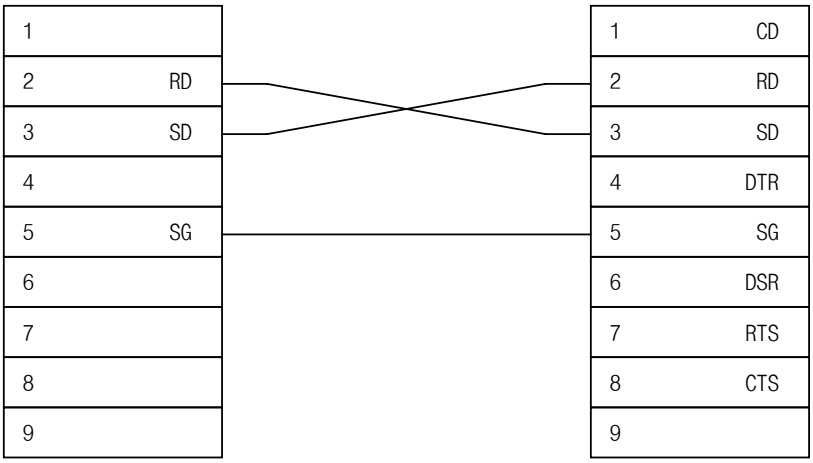
2.1.2.1 System Configuration

The above figure shows system configuration to connect IMO K-Series PLC to PMU.

Controller	Comm. Module	Cable	PMU
			
K10S, K30S, K60S, K100S	None	Refer to connection Diagram.(RS-232C)	All PMU
K10S1			
K60H,K200H			

2.1.2.2 Cable Diagram

(1) RS-232C (K-Series ↔ PMU(for 9/15 Pin Connector))



Warning

In case of Using Loader Port, Only above 3 wires have to be connected. Other wire connection except above 3 can cause controller's Mal-function or abnormal state.

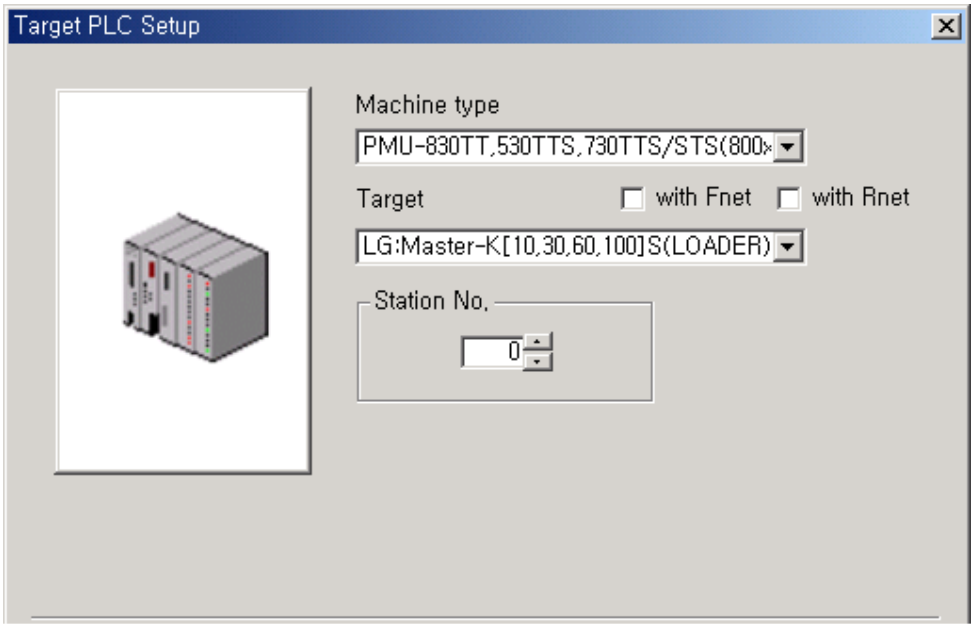
2.1.2.3 K-Series PLC Setup

In case of K-Series, special setup is not needed.

2.1.2.4 PMU Setup

(1) PMU Editor Setup

Select your controller, “K10S,K30S,K60S,K100S(LOADER)” or “K10S1 (LOADER)” or “K60H,K200H (LOADER)” in “K-Series Series” of controller type



(2) Serial Setup

Special setup is not needed.

Default communication setup of PMU are as follows :

- Serial Baud Rate : 9600bps
- Serial Data Bit : 8bit
- Serial Stop Bit: 1bit
- Serial Parity Bit : None
- Serial Signal Level : RS-232C
- Station No. at Communication Diagnosis(0~31): Not used.

2.1.3 Available Address List

Controller's address to read/write from/to PMU is as following list.

(1) K10S1,K10S,K30S,K60S,K100S

Address			K10S1	K10S,K30S,K60S,K100S
Device	Dev.No	Ref.	Address Area	Address Area
Input/Output (P)	0	Bit	P0000 – P0001	P0000 – P0005
Aux. Relay (M)	1	Bit	M0000 – M0015	M0000 – M0031
LINK Relay (L)	2	Bit	L0000 – L0007	L0000 – L0015
KEEP Relay (K)	3	Bit	K0000 – K0007	K0000 – K0015
Special Relay (F)	4	Bit	F0000 – F0015	F0000 – F0015
Timer-CV (T)	5	Word	T0000 – T0047	T0000 – T0127
Counter-CV (C)	6	Word	C0000 – C0015	C0000 – C0127
Data Register (D)	7	Word	D0000 – D0063	D0000 – D0255
Special Register (S)	8	Word	S0000 – S0099	S0000 – S0099

- CV=Current Value

(2) K60H/200H

Address			K60H	K200H
Device	Dev. No	Ref.	Address Area	Address Area
Input/Output (P)	0	Bit	P0000 - P0005	P0000 - P0011
Aux. Relay (M)	1	Bit	M0000 - M0031	M0000 - M0063
LINK Relay (L)	2	Bit	L0000 - L0015	L0000 - L0011
KEEP Relay (K)	3	Bit	K0000 - K0015	K0000 - K0031
Special Relay (F)	4	Bit	F0000 - F0015	F0000 - F0015
Timer-CV (T)	5	Word	T0000 - T0127	T0000 - T0255
Counter-CV (C)	6	Word	C0000 - C0127	C0000 - C0255
Data Register (D)	7	Word	D0000 – D0255	D0000 – D1023
Special Register (S)	8	Word	S0000 – S0031	S0000 – S0099

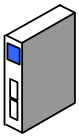
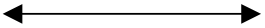
2.2 IMO G-SERIES GM /New K-Series

2.2.1 G-SERIES GM /New K-Series Cnet Serial Interface

The following section describes the system configuration and interface between IMO G-SERIES GM GM and NEW K-SERIES PLC's C-net and PMU using RS-232C and RS-422.

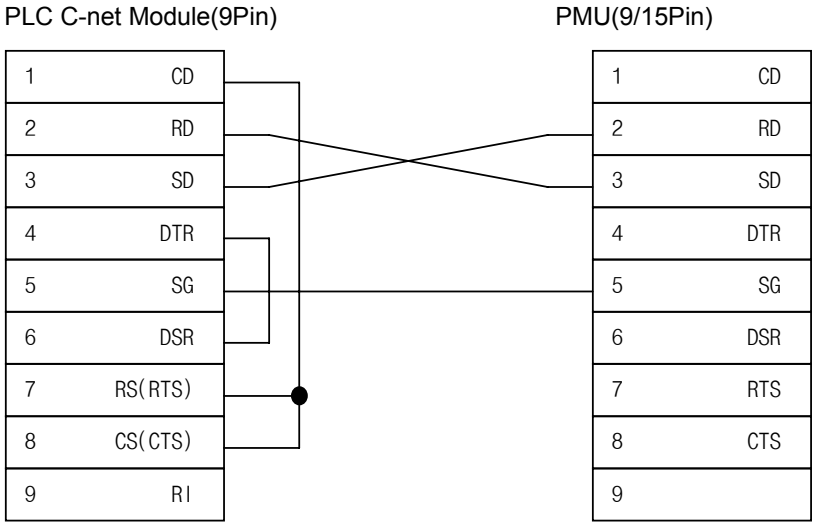
2.2.1.1 System Configuration

The above figure shows system configuration to connect G-SERIES GM GM and NEW K-Series PLC to PMU using C-net.

PLC	Comm. Unit	Cable	PMU
			
G-SERIES GM1/2/3/4 NEW K-SERIES 1000S	G3L-CUEA K7F-CUEA	Refer Connection diagram (RS-232C, RS-422)	All PMU
G-SERIES GM6, G-SERIES GM7, NEW K-SERIES 300S, 200S, 80S (K7)	G6L-CUEA K3F-CU2A G7LCUEB G7LCUEC		

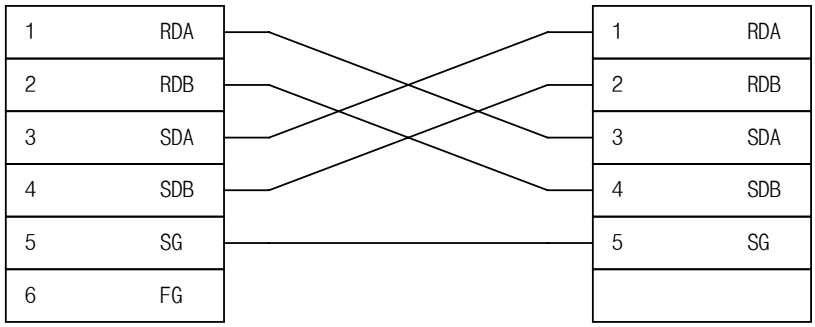
2.2.1.2 Cable Diagram

(1) RS-232C (G-SERIES GM/New K-Series ↔ PMU (for 9/15 Pin Connector))



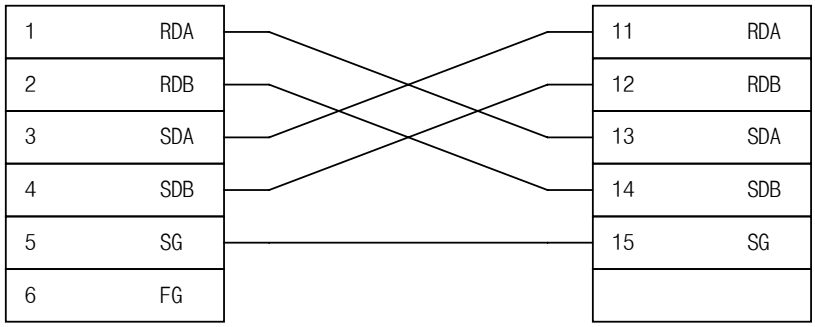
(2) RS-422 (G-SERIES GM/New K-Series ↔ PMU(for 5Pin Terminal Block))

PLC C-net(6Pin Terminal Block) PMU(5Pin Terminal Block)



(3) RS-422 (G-SERIES GM/New K-Series ↔ PMU (for 15Pin Connector))

PLC C-net(6Pin Terminal Block) PMU(15Pin Connector)



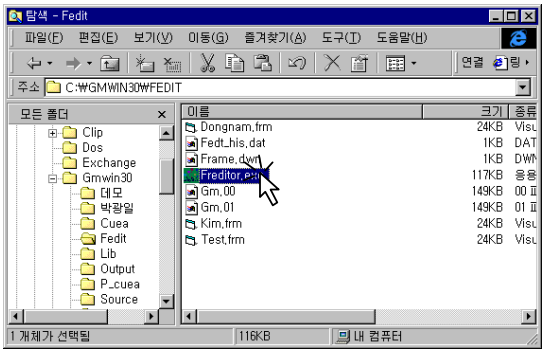
2.2.1.3 C-net Module Setup

(1) Parameter Setup by Software

In case of C-net module of G-Series/New K-Series PLC, you have to setup parameters by using software ‘Frame Editor’

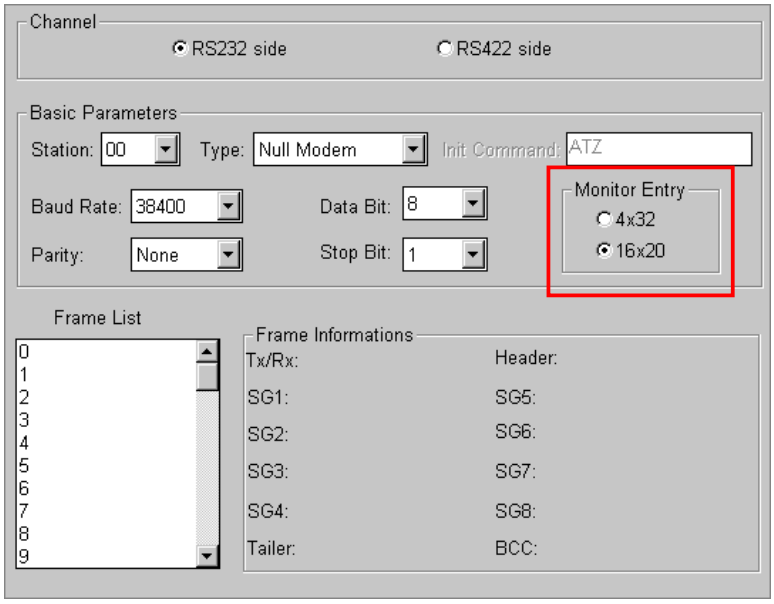
The method of setup is as follows

① Execute software ‘FREDITOR.EXE’



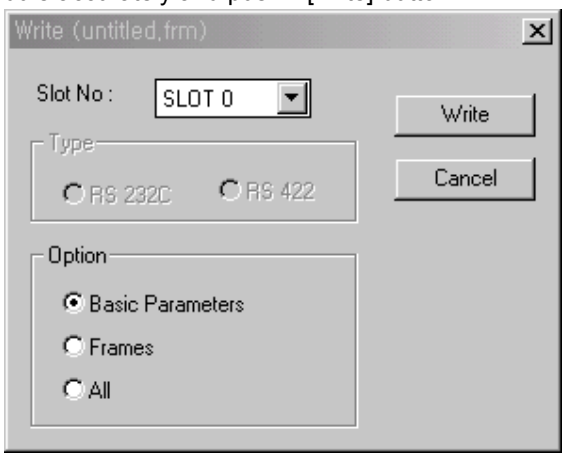
② Setup Comm. Net., Baud Rate, Data Bit, Parity Bit, Stop Bit, and Number of Monitor Reg.

③ Select [On Line]-[Connection].



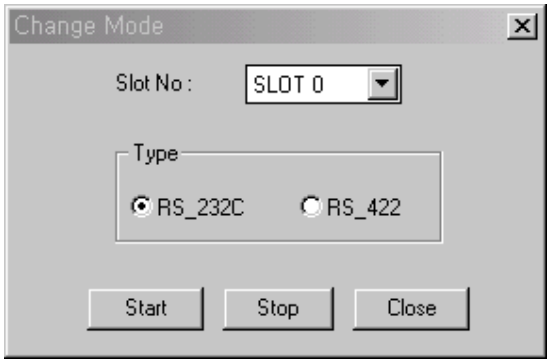
④ Following dialog box means ‘connection complete’.

⑤ Select [On Line]-[Write] Menu for writing parameter. If following dialog box appears, setup “Slot No.” of C-net module accurately and push [write] button



⑥ Following dialog box means ‘Parameter Writing Complete’.

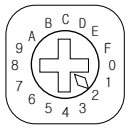
⑦ If wring is complete, C-net module is not active, therefore restart by selecting [On Line]-[Change Comm] Menu.



⑧ If Action “Start” is completed, select [On Line]-[Disconnect] Menu and disconnect.

(2) Hardware Mode Setup

Setup mode of C-net module by rotary switch. C-net module support as following modes.

S/W Figure	Mode S/W Value	Mode		Ref.
		RS-232C	RS-422	
	0	User Define Comm.	User Define Comm.	Linked Mode
	1	Exclusive Comm.	Exclusive Comm.	
	2	User Define Comm.	User Define Comm.	Independent Mode
	3	Exclusive Comm.	Exclusive Comm.	
	4	User Define Comm.	Exclusive Comm.	Independent Mode
	5	Exclusive Comm.	User Define Comm.	
	6	GMWIN	User Define Comm.	
	7	GMWIN	Exclusive Comm.	
	8	LOOP-BACK	LOOP-BACK	Diagnosis
	9 ~ F	Reserved		Not Used

Modes to enable to communicate to PMU are as follows.

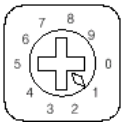
Mode S/W Value	Description
1	Linked Mode of Exclusive Comm.(RS-232C Enable)
3	RS-232C, RS-422 Exclusive Comm. Mode(RS232c/422 Enable)
4	RS-422 Exclusive Comm. Mode
5	RS-232C Exclusive Comm. Mode
7	RS-422 Exclusive Comm. Mode

Recommend Mode 3. for RS-232C and RS-422 communication.

Caution

The contents of the above table can be available for only **GM4(G4L-CUEA) and MK-300S(K4F-CUEA).**

2.2.1.4 K3F-CU2A/4A Operation Mode

Switch	Mode S/W Value	Operation Mode	Remarks
	0	User Define Comm.	
	1	Exclusive Comm.	
	2	KGL-WIN Service	
	3	loop-BACK	
	4	Reserved	Not Used
	5	Reserved	
	6	Reserved	
	7	Reserved	
	8	Flash Write Mode	
	9	Online Mode	

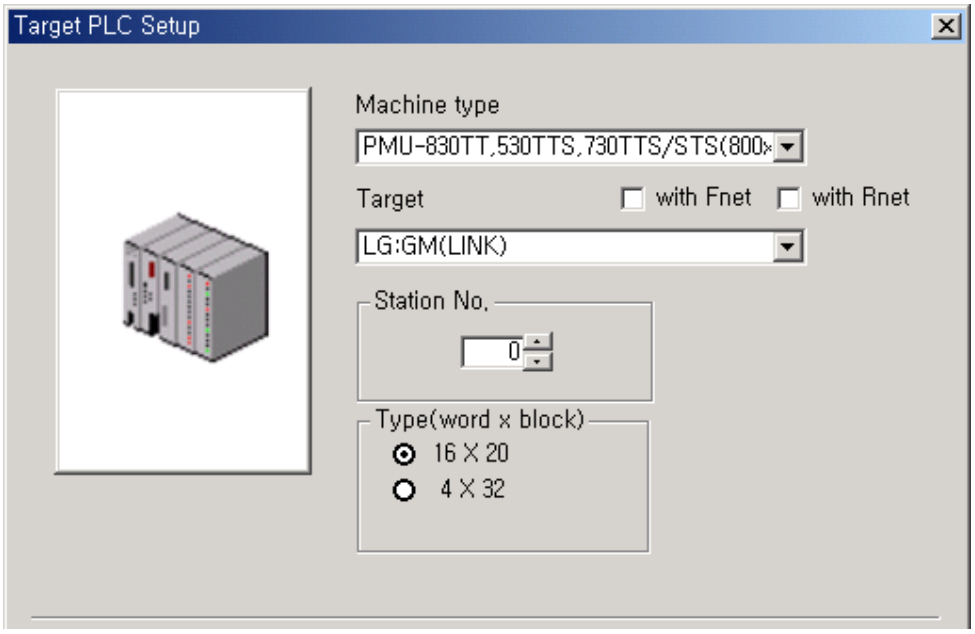
Ref.

Set Mode S/W to mode 1 in order to communication with PMU

2.2.1.5 PMU Setup

(1) PMU Editor Setup

Select “GM(LINK)” or “K-Series(80 (K7),200,300,1000)S(LINK)”of “G-SERIES GM/New K-Series Series” up to PLC .



(2) PMU Serial Setup

Serial communication settings are as follows :

- Serial Baud Rate : Same as controller’s setting.
- Serial Data Bit : Same as controller’s setting.
- Serial Stop Bit : Same as controller’s setting.
- Serial Parity Bit : Same as controller’s setting.
- Serial Signal Level : Same as controller’s setting.
- Controller’s Station No. at Comm. Diagnosis(0~31)
- : Same as controller’s setting.

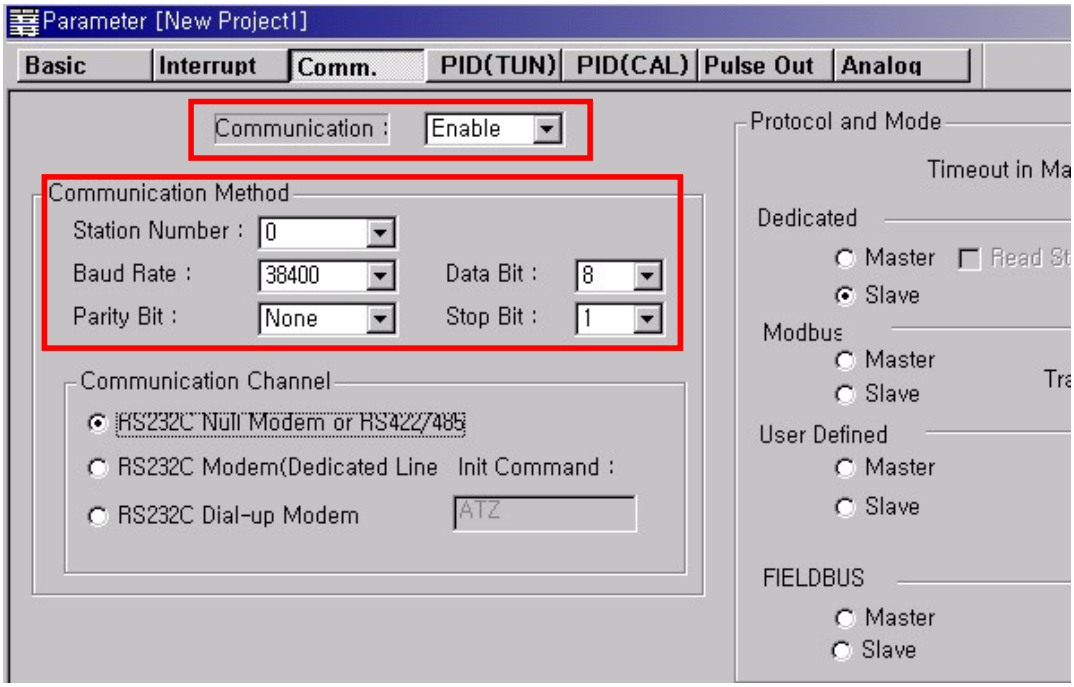
2.2.1.6 80S (K7) / (GM7)/200S(GM6) Setup

(1) Dip switch of “Built in Cnet” on the upper of **80S (K7) / (GM7)** has to be switched to ON.

The method to setup PLC parameter in order to use built-in Cnet

(2) K-Series 80S (K7) (or GM7)

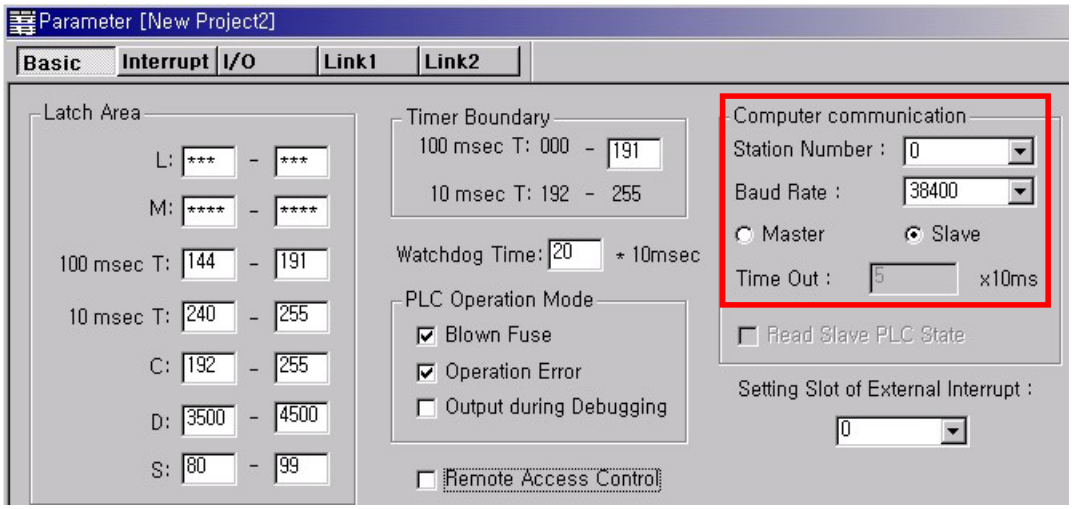
In KGL-WIN(GM-Win) PLC software, select PLC type as 80S (K7) / (GM7), and select parameter item in project file.



- Set “Communication” to Enable
- Set communication parameters such as station number, baud rate, parity bit etc.

(3) K-Series 200S (or GM6)

In KGL-WIN(GM-Win) PLC software, select PLC type as 200S (GM6), and select parameter item in project file.



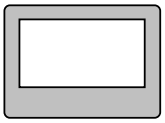
- Set communication parameters such as station number, baud rate.

2.2.2 G-SERIES GM / New K-Series CPU Direct

The following section describes the system configuration and interface between IMO G-SERIES GM and NEW K-SERIES PLCs and PMU by RS-232C using CPU direct.

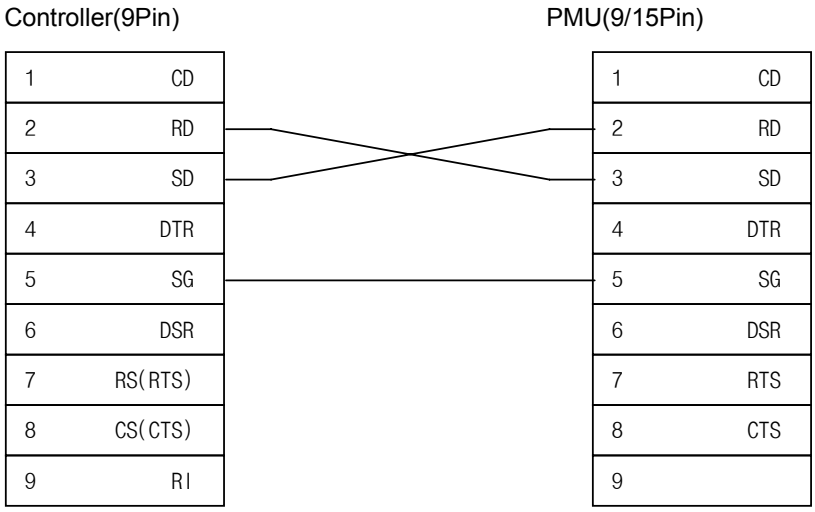
2.2.2.1 System Configuration

The above figure shows system configuration to connect G-SERIES GM and NEW K-Series PLC to PMU using CPU Direct.

Controller	Comm. Module	Cable	PMU
			
G-SERIES GM1/2/3/4 NEW K-SERIES 1000S G-SERIES GM6, G-SERIES GM7, NEW K-SERIES 300S,200S, 120S,80S (K7)	None	Refer to Connection Diagram. (RS-232C)	All PMU

2.2.2.2 Cable Diagram

(1) RS-232C (G-SERIES GM/New K-Series ↔ PMU(for 9/15 Pin Connector))



Warning

In case of Using Loader Port, Only above 3 wires have to be connected. Other wire connection except above 3 can cause controller's mal-function or abnormal state.

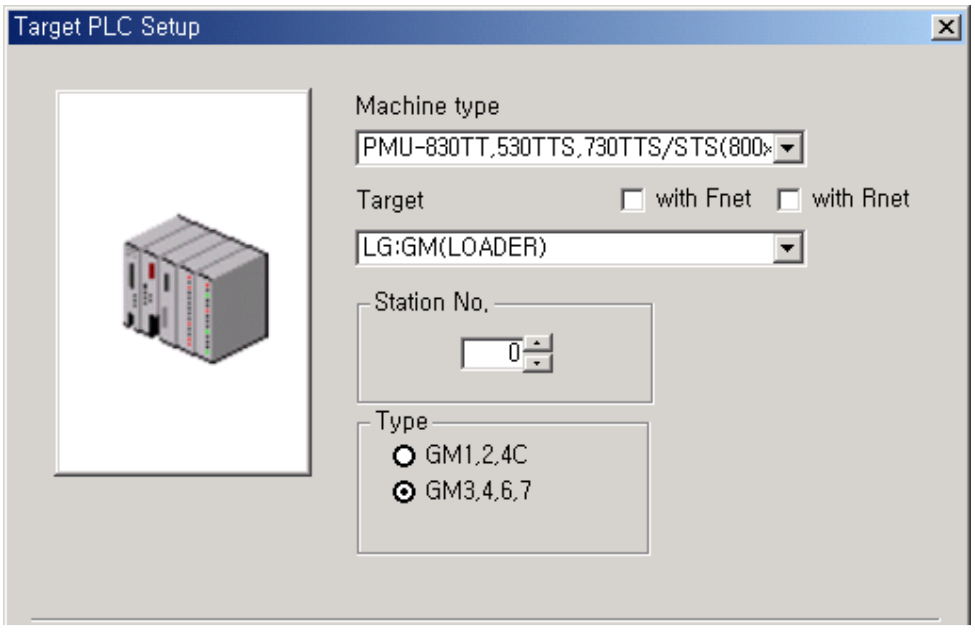
2.2.2.3 GLOFA -GM/New K-Series PLC Setup

In case of GLOFA -GM/New K-Series PLC, Special settings are not needed.

2.2.2.4 PMU Setup

(1) PMU Editor Setup

Select "GM(LOADER)" or "K-Series(80 (K7),120,200,300,1000)S(LOADER)"of "G-SERIES GM / New K-Series Series" up to PLC .



(2) PMU Serial Setup

Special settings are not needed.

Default communication settings of PMU are as follows.

- Serial Baud Rate : 38400 bps
- Serial Data Bit : 8bit
- Serial Stop Bit : 1bit
- Serial Parity Bit : None
- Serial Signal Level : RS-232
- Controller’s Station No. at Comm. Diagnosis(0~31) : Not Used

2.2.3 Available Address List

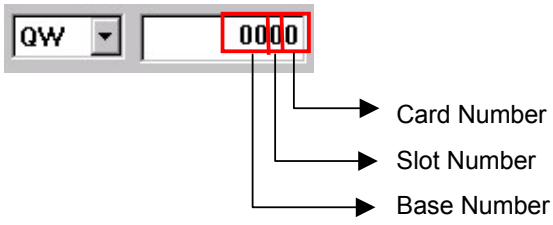
Controller's address to enable to read/write in PMU is as follows.

2.2.3.1 G-SERIES GM

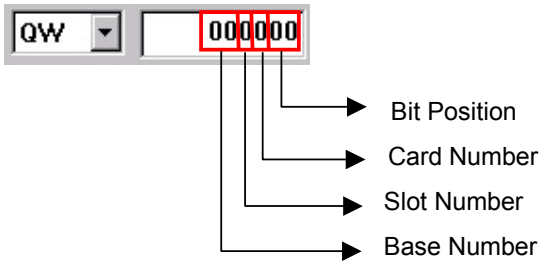
Item	WORD	Address Area
GM1	%I(Input)	%IW00.0.0 ~ %IW63.7.3
	%Q(Output)	%QW00.0.0 ~ %QW63.7.3
	%M(Inner Memory)	%MW0 ~ %MW65535
GM2	%I(Input)	%IW00.0.0 ~ %IW31.7.3
	%Q(Output)	%QW00.0.0 ~ %QW31.7.3
	%M(Inner Memory)	%MW0 ~ %MW65535
GM3, GM4	%I(Input)	%IW00.0.0 ~ %IW07.7.3
	%Q(Output)	%QW00.0.0 ~ %QW07.7.3
	%M(Inner Memory)	%MW0 ~ %MW32767
GM6, GM7	%I(Input)	%IW00.0.0 ~ %IW07.7.3
	%Q(Output)	%QW00.0.0 ~ %QW07.7.3
	%M(Inner Memory)	%MW0 ~ %MW16383

(1) PMU addressing for GM PLC

- Word address for Input / Output



- Bit address for Input / Output



2.2.3.2 NEW K-SERIES

Device	Type	1000S	300S	200S	80S (K7)
P(I/O Relay)	Bit	P0000~P063F (1024Point)	P0000~P031F (512Point)	P0000~P011F (192Point)	P0000~P015F
M(Inner Relay)	Bit	M0000~M191F(3072Point)			M0000~M191F
K(Keep Relay)	Bit	K0000~K031F(512Point)			K0000~M031F
L(Link Relay)	Bit	L0000~L063F(1024 Point)			L0000~L063F
F(Special Relay)	Bit	F0000~F063F(1024 Point)			F0000~F063F
T(Timer)	Bit	T000~T255(256 Point)			T0000~T1255
C(Counter)	Bit	C000~C255(256 Point)			C000~C255
S(Step Relay)	Bit	S00.00~S99.99			S00.00~S99.99
D(Data Register)	Word	D0000~D9999 (10000 Point)	D0000~D4999 (5000 Point)	D0000~D1999 (2000 Point)	D0000~D4999

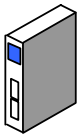
2.3 Mitsubishi MELSEC Series

2.3.1 AnN, AnS, A0J2, AOJ2H, AnA, AnU, FX Interface

The following section describes the system configuration and interface between Mitsubishi MESEC PLC and PMU by RS-232C/RS-422 using Computer Link Unit.

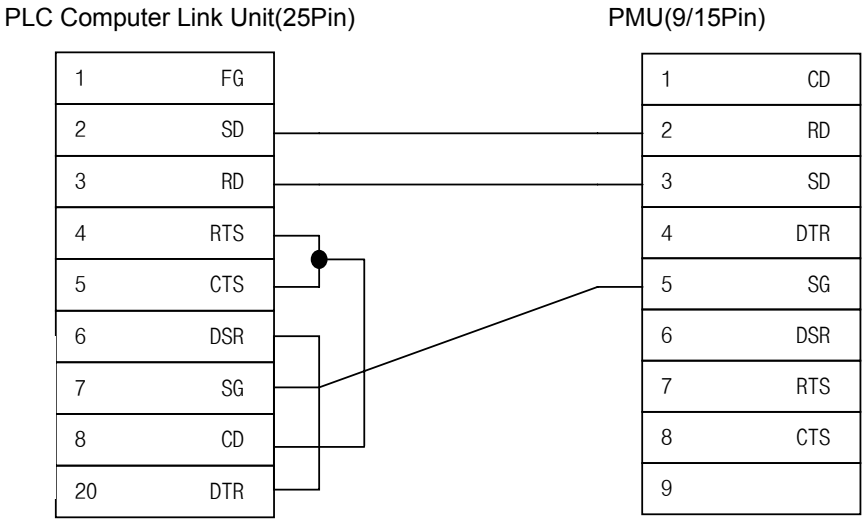
2.3.2 System Configuration

The above figure shows system configuration to connect MESEC PLC to PMU using MELSEC Computer Link Unit.

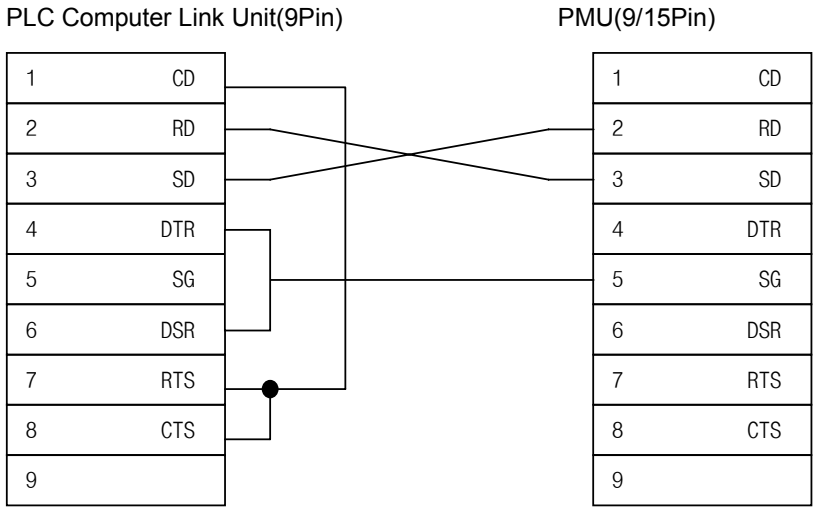
<table>
<tr><th>PLC</th><th>Comm. Unit</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td>  </td><td></td><td> </td></tr>
<tr><td>AnN</td><td>AJ71C24-S8</td><td rowspan="5">Refer to Connection Diagram (RS-232C,RS-422)</td><td rowspan="6">All PMU</td></tr>
<tr><td>AnS</td><td>A1SJ71C24-R2
A1SJ71UC24-R2
A1SJ71C24-R4</td></tr>
<tr><td>A0J2, AOJ2H</td><td>A0J2C214-S1</td></tr>
<tr><td>AnA, AnU</td><td>AJ71UC24</td></tr>
<tr><td rowspan="2">FX</td><td>FX2N-232-BD</td><td>RS-232C</td></tr>
<tr><td>FX2N-422-BD</td><td>RS-422</td></tr>
</table>

2.3.2.1 Cable Diagram

(1) RS-232C (MELSEC (Except A1SJ71C24-R2/FX2N-232-BD) ↔ PMU (for 9/15 Pin Connector))

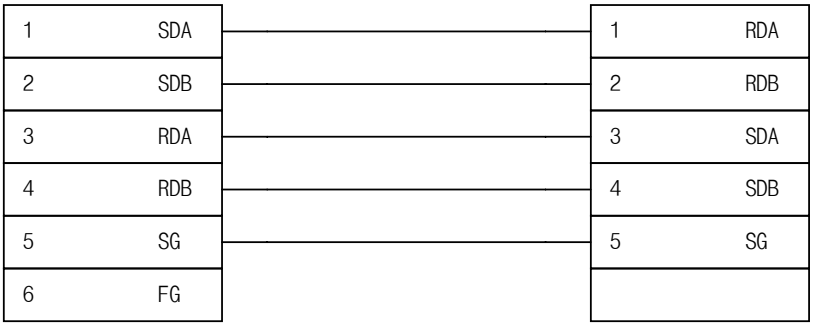


(2) RS-232C (A1SJ71C24-R2/FX2N-232-BD ↔ PMU for (9/15 Pin Connector)



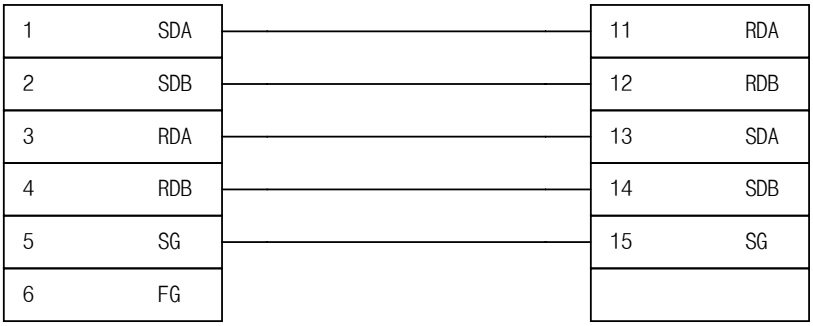
(3) RS-422 (MELSEC PLC ↔ PMU)

PLC Computer Link Unit (6Pin Terminal Block) PMU(5Pin Terminal Block)



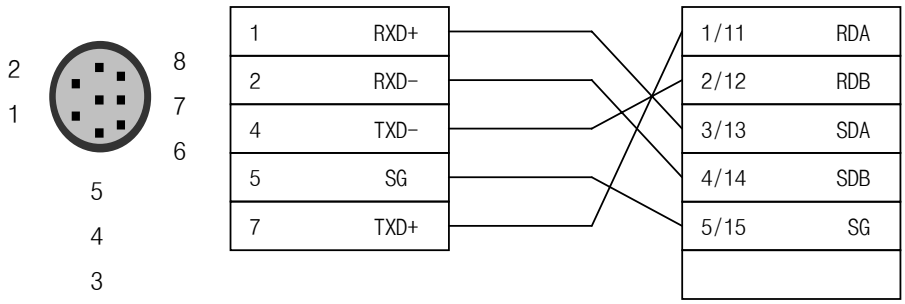
(4) RS-422 (MELSEC PLC(Except FX2N-422-BD) ↔ PMU (for 15Pin Connector))

PLC Computer Link Unit (6Pin Terminal Block) PMU(15Pin)



(5) RS-422 (FX2N-422-BD ↔ PMU(for 5Pin Terminal Block or 15Pin Connector))

PLC Computer Link Unit (8Pin Male Type Connector of Cable) PMU (5Pin Terminal Block/15PIN)

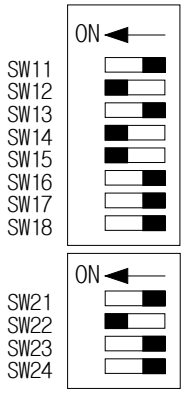


2.3.2.2 MELSEC Computer Link Unit Setup

(1) AJ71C24-S8

① Parameter Setup

You can set parameters by Dip Switch in AJ71C24-SB used in AnN, AnA PLC.



Switch	Setting Item	Set Switch Status							
		ON				OFF			
SW11	Main Channel Set	RS-422				RS-232C			
SW12	Data Bit	8 Bit				7 Bit			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	-
SW13	Baud Rate Setting	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW14		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW15		OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW16	Parity	Exist				None			
SW17	Even/Odd Parity	Even				Odd			
SW18	Stop Bit	2 Bit				1 Bit			
SW21	BCC *1	Exist				None			
SW22	RUNNIG Write	Enable				Disable			
SW23	Transmit Terminal Resistance	Exist				None			
SW24	Receive Terminal Resistance	Exist				None			

Note

*1 BCC can be set only 'Exist'.

② Station Number Setup

Station No. is set by 2 rotary switch.

Please set 00 station basically.

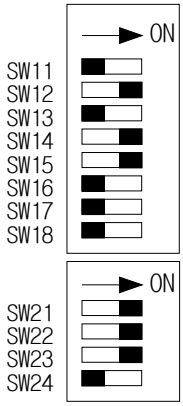
③ Communication Mode Setup

Specify exclusive protocol that Computer Link Unit include, and set by rotary switch. PMU support protocol type 1, and mode switch is set 5 or A.

(2) AJ71UC24

① Parameter Setup

You can set parameters by Dip Switch in AJ71UC24-SB used in AnN, AnA PLC.



Switch	Setting Item	Set Switch Status							
		ON				OFF			
SW11	Main Channel Set	RS-422/485				RS-232C			
SW12	Data Bit	8 Bit				7 Bit			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	-
SW13	Baud Rate Set	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW14		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW15		OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW16	Parity	Exist				None			
SW17	Even/Odd Parity	Even				Odd			
SW18	Stop Bit	2 Bit				1 Bit			
SW21	BCC *1	Exist *1				None			

Switch	Setting Item	Set Switch Status	
		ON	OFF
SW22	RUNNING Write	Enable	Disable
SW23	Computer Link	Computer Link *2	Multi Drop Link
SW24	Not Used		

REF.

*1 BCC can be set only “Exist”.

*2 SW23 must be set ‘Computer Link’.

② Station Number Setup

Station No. is set by 2 rotary switch.

Please set 00 station basically.

③ Communication Mode Setup

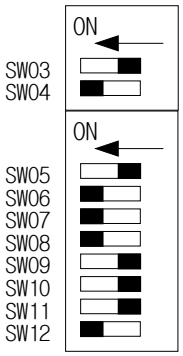
Specify exclusive protocol that Computer Link Unit include, and set by rotary switch. PMU support protocol type 1, and mode switch is set 5 or A.

(3) A1SJ71C24-R2

① Parameter Setup

A1SJ71C24-R2 is Communication Unit for RS-232C in A1S PLC.

Parameters are set by Dip Switch in A1SJ71C24-R2.



Switch	Setting Item	Set Switch Status							
		ON				OFF			
SW03	Not Used								
SW04	RUNNING Write	Enable				Disable			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	-
SW05	Baud Rate Setting	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW06		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW07		OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW08	Data Bit	8 Bit				7 Bit			
SW09	Parity	Exist				None			
SW10	Even/Odd Parity	Even				Odd			
SW11	Stop Bit	2 Bit				1 Bit			
SW12	BCC	Exist				None			

② Station Number Setup

Station No. is set by 2 rotary switch.

Please set 00 station basically.

③ Comm. Mode Setup

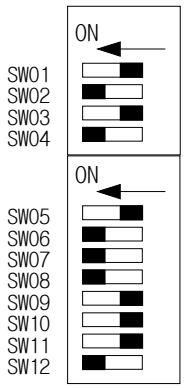
Specify exclusive protocol that Computer Link Unit include, and set by rotary switch. PMU support protocol type 1, and mode switch is set 1.

(4) A1SJ71C24-R4

① Parameter Setup

A1SJ71C24-R4 is Computer Link Unit for RS-422 in A1S PLC.

Parameters are set by Dip Switch in A1SJ71C24-R4.



Switch	Setting Item	Set Switch Status							
		ON				OFF			
SW01	Master/Local Set	Multi Drop Link/Master				Multi Drop Link/Local			
SW02	Mode Select	Computer Link				Multi Drop Link			
SW03	Unused								
SW04	RUNNING Write *2	Enable				Disable			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	-
SW05	Baud Rate Set	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW06		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW07		OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW08	Data Bit	8 Bit				7 Bit			
SW09	Parity	Exist				None			
SW10	Even/Odd Parity	Even				Odd			
SW11	Stop Bit	2 Bit				1 Bit			
SW12	BCC	Exist				None			

*1 SW10 must be set to ‘Computer Link’.
*2 SW04 must be set to ‘Enable’.

② Station Number Setup

Station No. is set by 2 rotary switch.

Please set 00 station basically.

③ Communication Mode Setup

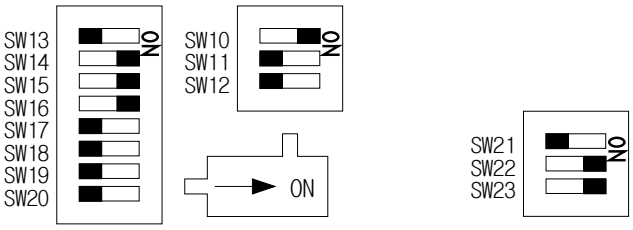
Specify exclusive protocol that Computer Link Unit include, and set by rotary switch. PMU support protocol type 1, and mode switch is set 1.

(5) A0J2-C214-S1

① Parameter Setup

A0J2-C214-S1 is Computer Link Unit for RS-232C/RS-422 in A0J2 PLC.

Parameters are set by Dip Switch in front of A0J2-C214-S1 unit.



Switch	Setting Item	Set Switch Status							
		ON				OFF			
SW10	Mode Select	Computer Link *1				Multi Drop Link			
SW11	Main Channel Set	RS-422				RS-232C			
SW12	RUNNING Write	Enable *2				Disable			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	-
SW13	Baud Rate Set	OFF	ON	OFF	ON	OFF	ON	OFF	ON
SW14		OFF	OFF	ON	ON	OFF	OFF	ON	ON
SW15		OFF	OFF	OFF	OFF	ON	ON	ON	ON
SW16	Data Bit	8 Bit				7 Bit			
SW17	Parity	Exist				None			
SW18	Even/Odd Parity	Even				Odd			
SW19	Stop Bit	2 Bit				1 Bit			
SW20	Sum Check	Exist				None			
SW21	Unused	Must be set to 'OFF'							
SW22	Transmit Terminal Resistance	Exist				None			
SW23	Receive Terminal Resistance	Exist				None			

REF.

*1 SW10 must be set to 'Computer Link'(ON).
*2 Running Write SW12 must be set to 'Enable'(ON).

② Station Number Setup

Station No. is set by 2 rotary switch(SW3, SW4).

Please set 00 station basically.

③ Communication Mode Setup

Specify exclusive protocol that Computer Link Unit include, and set by rotary switch(SW5). PMU support protocol type 1, and mode switch is set '1' or 'A' for RS-232C and '5' or 'A' for RS-422.

(6) FX2N-232-BD

① Special Register(D8120) Setup

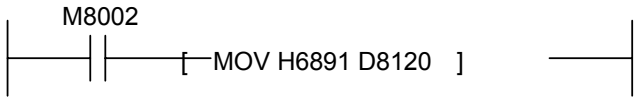
After D8120 Registers are set, turn off and restart 'ON 'power of PLC.

Bit No.	Setting Item	Description	
		0(OFF)	1(ON)
B0	Data Bit	7 bit	8 bit
B1 B2	Parity	(b2, b1) (0, 0) :None (0, 1) :Odd (1, 0) :Even	
B3	Stop Bit	1 Bit	2Bit
B4, B5, B6, B7	Baud Rate(bps)	(B7, B6, B5, B4) (0, 0, 1, 1) 300, (0, 1, 1, 1) 4800 (0, 1, 0, 0) 600, (1, 0, 0, 0) 9600 (0, 1, 0, 1) 1200, (1, 0, 0, 1) 19200 (0, 1, 1, 0) 2400	
B8	Header	Must be set to 'OFF(0)'.	
B9	Terminator		
B10, B11, B12	Control	(B12, B11, B10) (0, 0, 0) : RS485(422) (0, 1, 0) : RS232C	
B13	Sum Check	None	Exist
B14	Protocol	Must be set to 'ON(1)'.	
B15	Protocol Format	Protocol format 1	Protocol format 4

*1 B13 must be set to 'ON(Exist)'.
*2 B15 must be set to 'OFF(Protocol format 1)'.

(Example)

Data Length	8 bits
Parity	None
Stop bit	1 bits
Baud rate	19200 bps
Protocol	Dedicated Protocol
Header	No used
Terminator	No used
Protocol Format	Protocol format 1

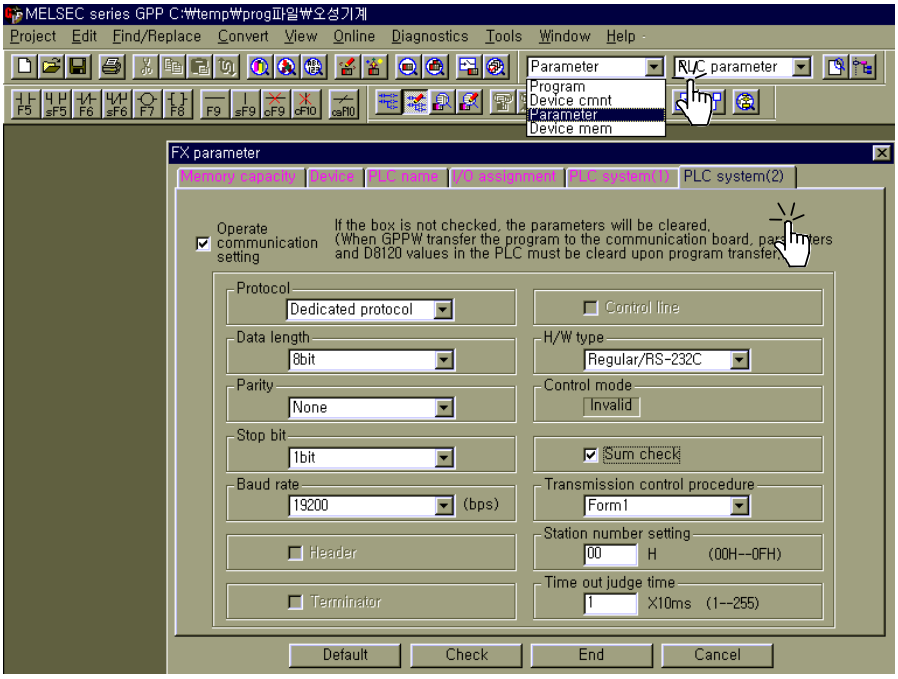


D8120 = [0110 1000 1001 0001]
6 8 9 1

② Special Register(D8121) Setup

You can set Station Number.

<FX Setup using PLC software : GPPW>

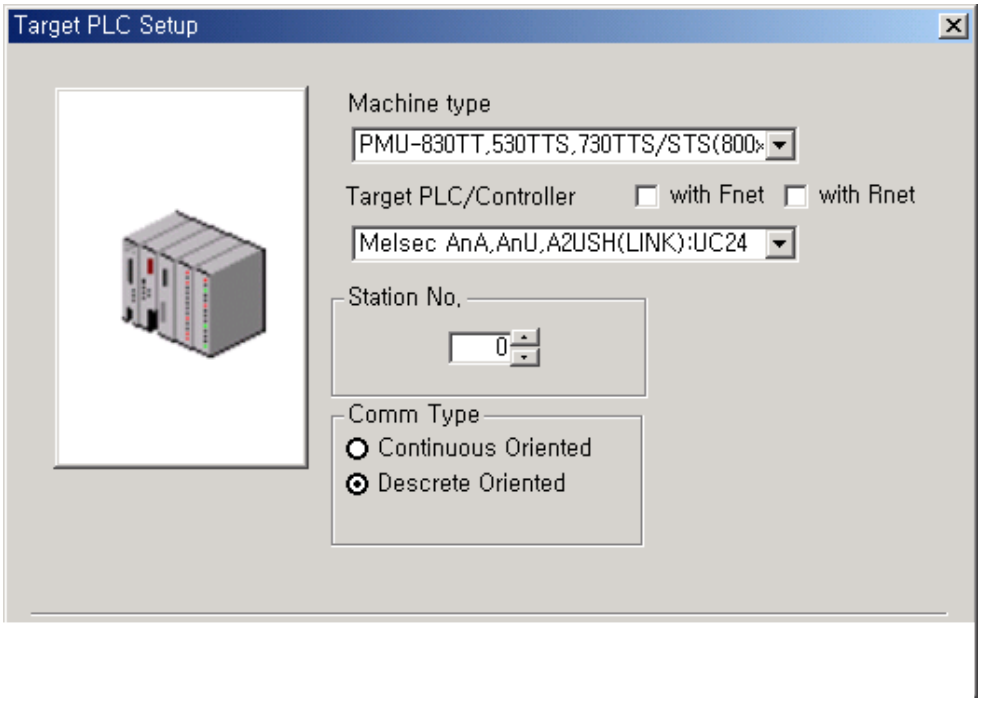


Select parameter in PLC software, GPPW and select communication parameters to be shown as the above figure.

2.3.2.3 PMU Setup

(1) PMU Editor Setting

Select “AnN, AnS, AoJ2(LINK)”, “AnA, AnU,A2USH(LINK)” or “FX(Link) of “MELSEC Series” up to PLC .



(2) PMU Serial Setup

Settings are as follows.

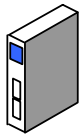
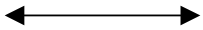
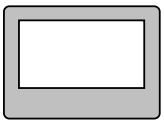
- Serial Baud Rate : Set same as PLC’s setting
- Serial Data Bit : Set same as PLC’s setting
- Serial Stop Bit : Set same as PLC’s setting
- Serial Parity Bit : Set same as PLC’s setting
- Serial Signal Level : Set same as PLC’s setting
- Controller’s Station No. at Comm. Diagnosis(0~31) : Set same as PLC’s setting

2.3.3 Melsec Q series Interface

The following section describes the system configuration and interface between Mitsubishi MESEC Q series and PMU by RS-232C/RS-422 using Computer Link Unit.

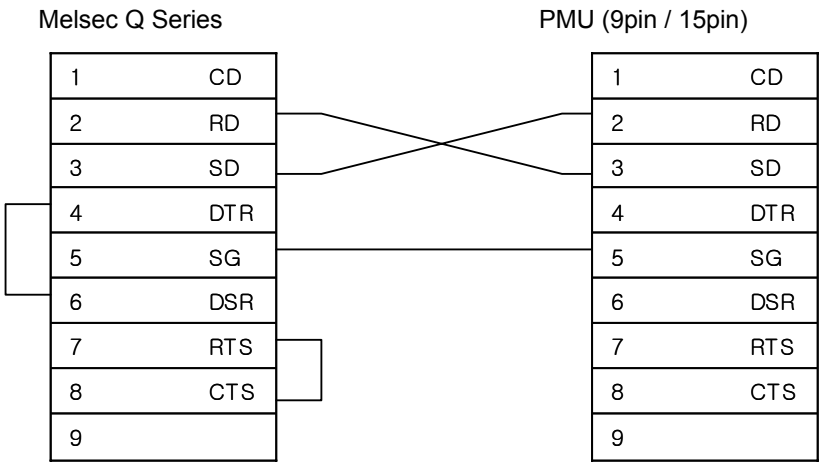
2.3.3.1 System Configuration

The above figure shows system configuration to connect MESEC Q series to PMU using MELSEC Computer Link Unit.

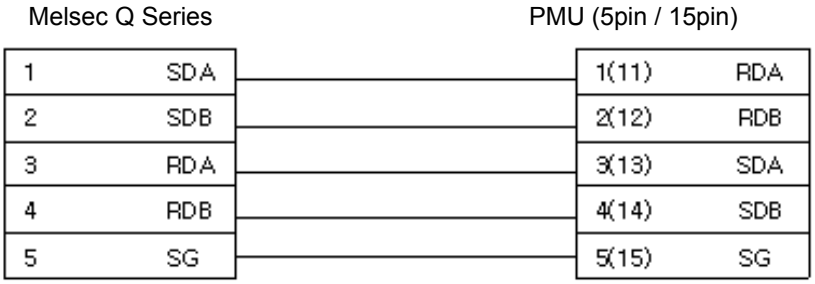
PLC	Comm. Unit	Cable	PMU
			
Q02 Q02H Q06H Q12H Q25H	QJ71C24 QJ71C24-R2	Refer to Connection Diagram (RS-232C,RS-422)	All PMU

2.3.3.2 Cable Diagram

(1) RS-232 (MELSEC Q Series ↔ PMU (for 9/15 Pin Connector))



(2) RS-422 (MELSEC Q Series ↔ PMU (for 5/15 Pin Connector))



2.3.3.3 Setup MELSEC- Q Series PLC parameters

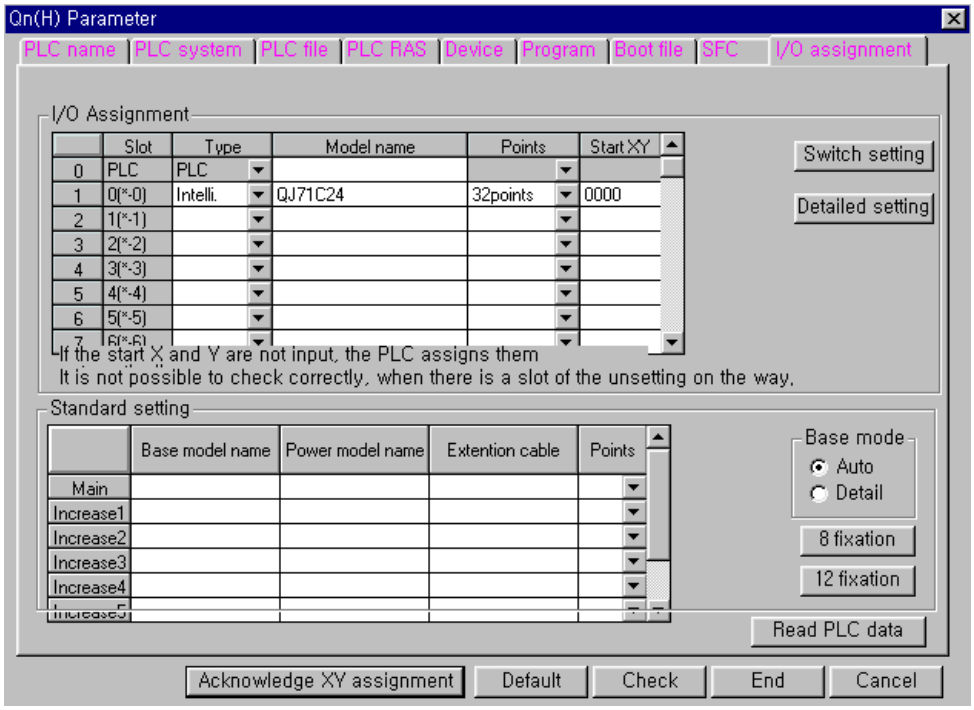
Item		Contents	
		QJ71C24	QJ71C24-R2
Interface	CH1	RS-232C (D-SUB 9P)	
	CH2	RS-232C (D-SUB 9P)	RS-422
Data Type	Data Bit	7 Or 8 Bit	
	Stop Bit	1 Or 2 Bit	
	Parity	Even / Odd / None	
Baud Rate		300bps / 600 / 1200 / 2400 / 4800 / 19200 / 38400 / 57600 / 115200 bps	

(1) I/O Assignment

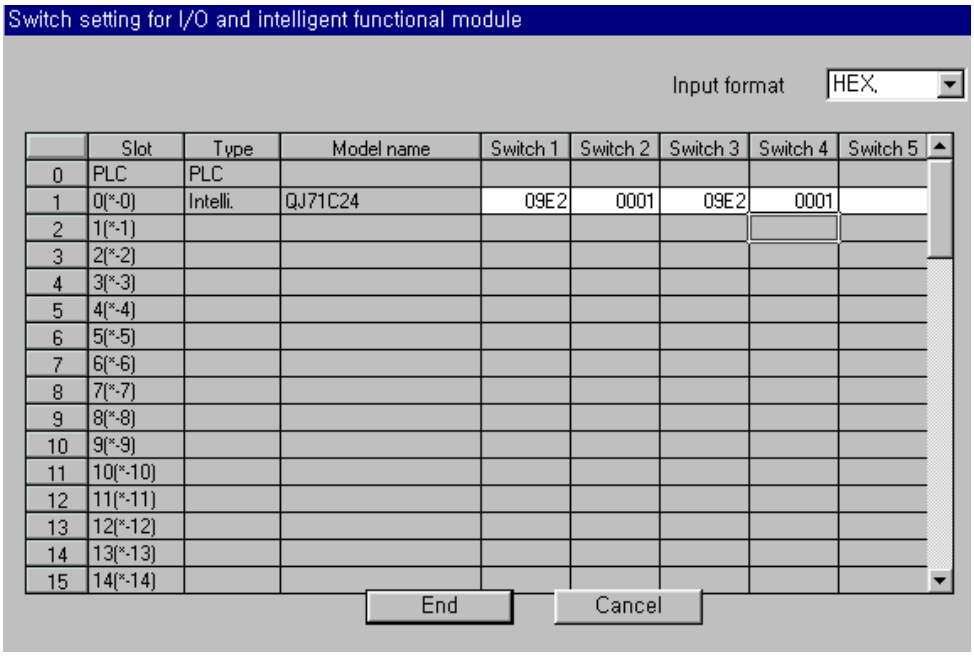
User has to setup I/O assignment for module type, points of I/O, range of I/O to be equipped in base module.

Item		Contents
I/O Assignment	Type	Intelligent
	Model name	Write communication model name such as QJ71C24/ QJ71C24-R2
	Points	32 points
	Start XY	Start input / output (Hex)
	Switch setting	Communication parameter such as baud rate, transmission type

(2) Sreen of I/O assignment



(3) Screen of Switch setting



CH1

CH2

QJ71C24

QJ71C24-R2

Switch No.	Contents		Remarks
Switch 1	b15 ~ b8	b7 ~ b0	
	CH1 Baud rate	CH1 Comm. Parameter	
Switch 2	CH1 protocol type		Set value of 0x0001
Switch 3	b15 ~ b8	b7 ~ b0	
	CH2 Baud Rate	CH2 Comm. Parameter	
Switch 4	CH2 Protocol type		Set value of 0x0001
Switch 5	Station No		

Ref.

Switch 2 and switch 4 must be set to 1 (0x0001)

(4) Comm. Parameter : CH1 (Switch 1), CH2 (Switch 3)

Bit	Contents	OFF(0)	ON(1)	Remarks
b0	Operation	independent	interlock	Set OFF(independent) for CH1
b1	Data bit	7	8	
b2	Parity bit	None	Exist	
b3	Odd/Even	Odd	Even	
b4	Stop bit	1	2	
b5	Sum check	None	Exist	Set to ON (Exist)
b6	Write in RUN	Prohibited	Permitted	Set to ON (Permitted)
b7	Setting change	Prohibited	Permitted	Set to ON (Permitted)

Ref.

The recommended setup value for comm. parameters is 1110 0010 (0xE2).

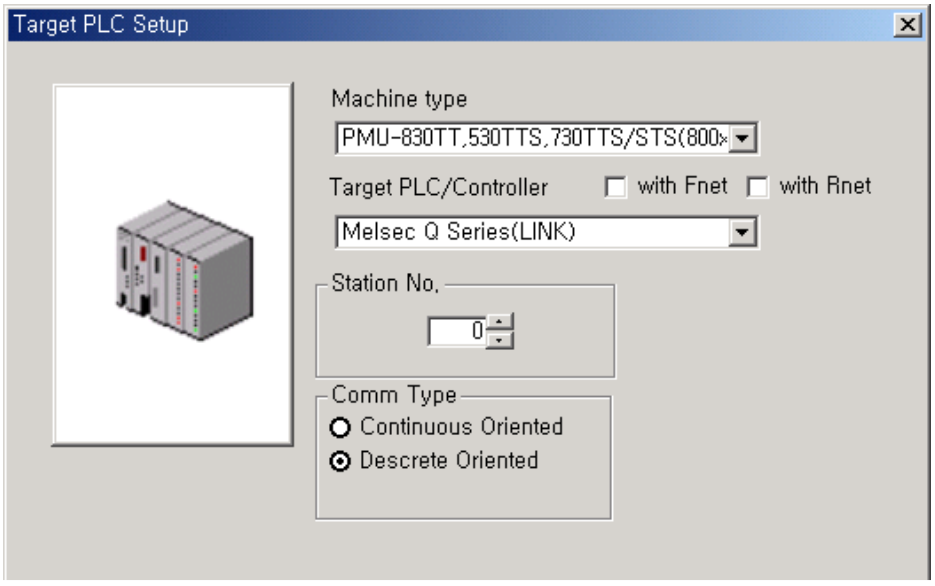
(5) Setup Baud rate

Baud Rate (bps)	Bit b15 ~ b8	Baud Rate (bps)	Bit B15 ~ b8
50	0FH	14400	06H
300	OOH	19200	07H
600	01H	28800	08H
1200	02H	38400	09H
2400	03H	57600	0AH
4800	04H	115200	0BH
9600	05H		

2.3.3.4 PMU Setup

(1) PMU Editor Setup

Select Target PLC as “Melec Q Series (Link)” of Melsec Series.



(2) PMU Serial Setup

The recommended serial settings are as follows.

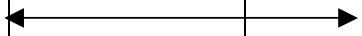
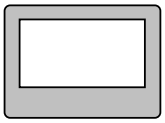
- Serial Baud Rate : 38400 bps
- Serial Data Bit : 8 bit
- Serial Stop Bit : 1 bit
- Serial Parity Bit : None
- Serial Signal Level : Set same as PLC's setting
- Controller's Station No. at Comm. Diagnosis(0~31) : Set same as PLC's setting

2.3.4 MELSEC CPU Direct

The following section describes the system configuration and interface between Mitsubishi MESEC PLC and PMU by RS-232C using CPU direct.

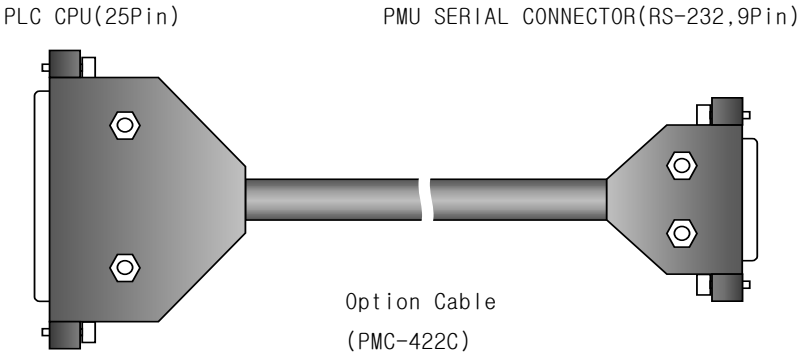
2.3.4.1 System Configuration

The above figure shows system configuration to connect MELSEC PLC to PMU using CPU Direct.

<table>
<tr><th>PLC</th><th>Comm. Module</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td>  </td><td></td><td>  </td></tr>
<tr><td>A2N,A3N</td><td rowspan="8">None</td><td rowspan="8">RS-422C</td><td rowspan="8">All PMU</td></tr>
<tr><td>A2A,A3A</td></tr>
<tr><td>A2U,A3U</td></tr>
<tr><td>A1SH,A2SH
A2USH,A2USH-S1</td></tr>
<tr><td>A0J2,AOJ2H</td></tr>
<tr><td>QnA</td></tr>
<tr><td>FX</td></tr>
</table>

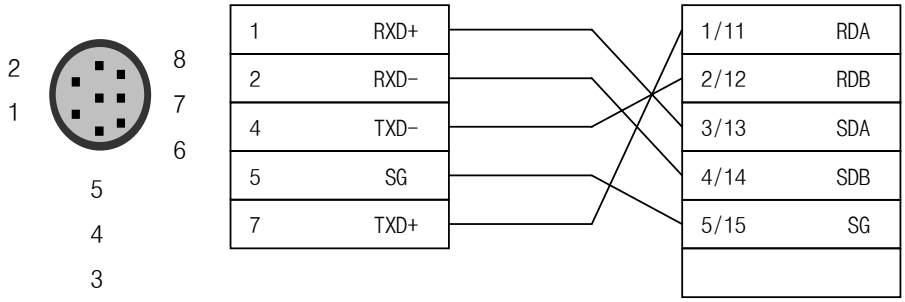
2.3.4.2 Cable Diagram

(1) RS-232C (MELSEC PLC ↔ PMU : Except for MELSEC FX Series)

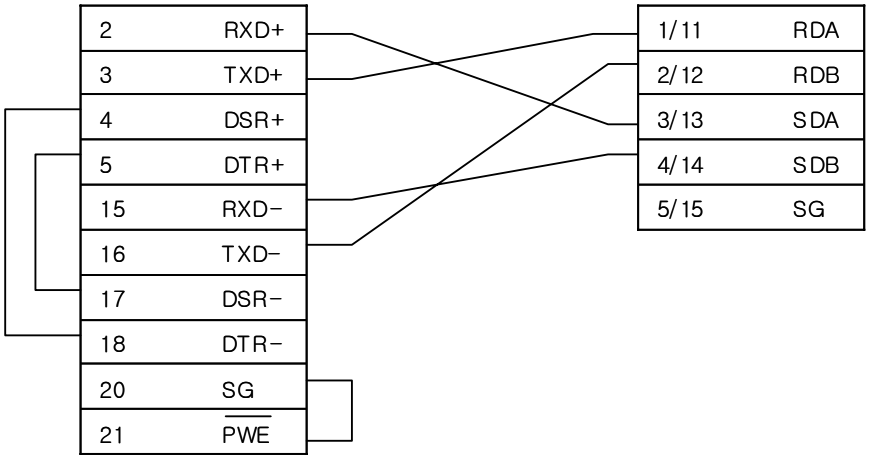


(2) RS-422 (FX 1S,1N,2N ↔ PMU(for 5Pin Terminal Block or 15Pin Connector))

PLC Computer Link Unit (8Pin Male Type Connector of Cable) PMU (5Pin Terminal Block/15PIN)



(3) RS-422 (FX ↔ PMU(for 5Pin Terminal Block or 15Pin Connector))



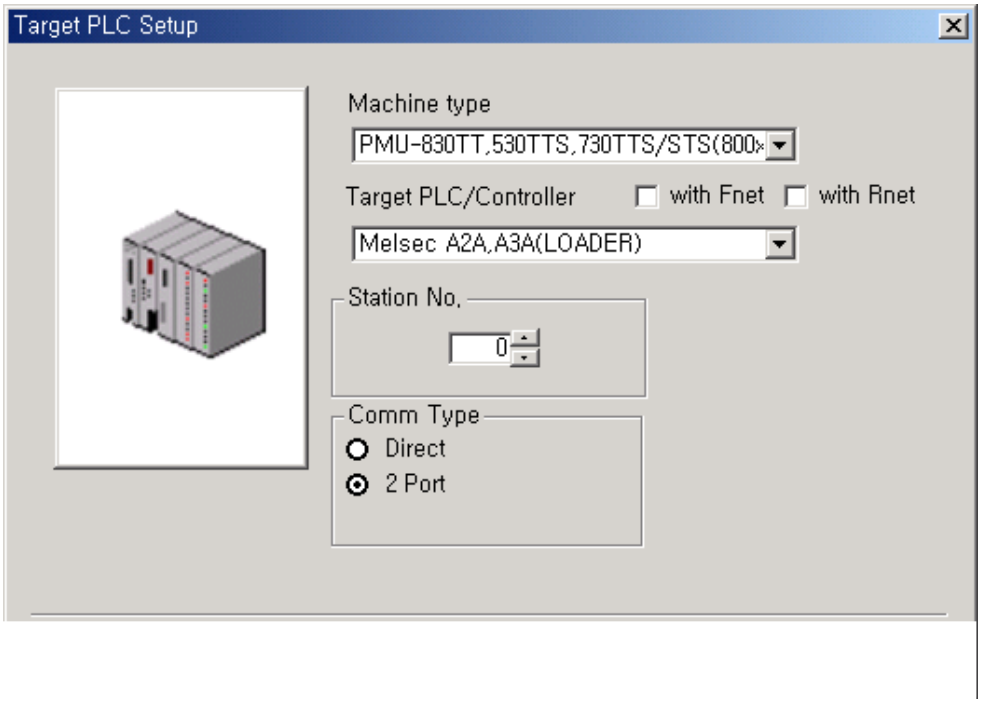
2.3.4.3 MELSEC PLC Setting

You don't need special settings in MELSEC PLCs.

2.3.4.4 PMU Setup

(1) PMU Editor Setup

Select "A2N,A3N(LOADER)"or "A2A,A3A(LOADER)"or "A2U,A3U(LOADER)" or "AnS,AOJ2H(LOADER)"or "A0J2(LOADER)"or "QnA(LOADER)" or "FX(LOADER)" of "MELSEC Series" up to PLC .



(2) PMU Serial Setup

Special settings are not needed. Automatic settings are as follows.

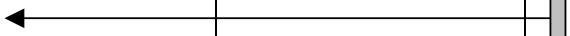
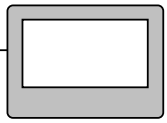
- Serial Baud Rate : 9600 bps
- Serial Data Bit : 8bit
- Serial Stop Bit : 1bit
- Serial Parity Bit : Odd
- Serial Signal Level : RS-232
- Controller's Station No. at Comm. Diagnosis(0~31) : Specified '0'

2.3.5 MELSEC- Q Series CPU Direct

The following section describes the system configuration and interface between MESELC-Q Series and TOP using serial communication through CPU Loader Port.

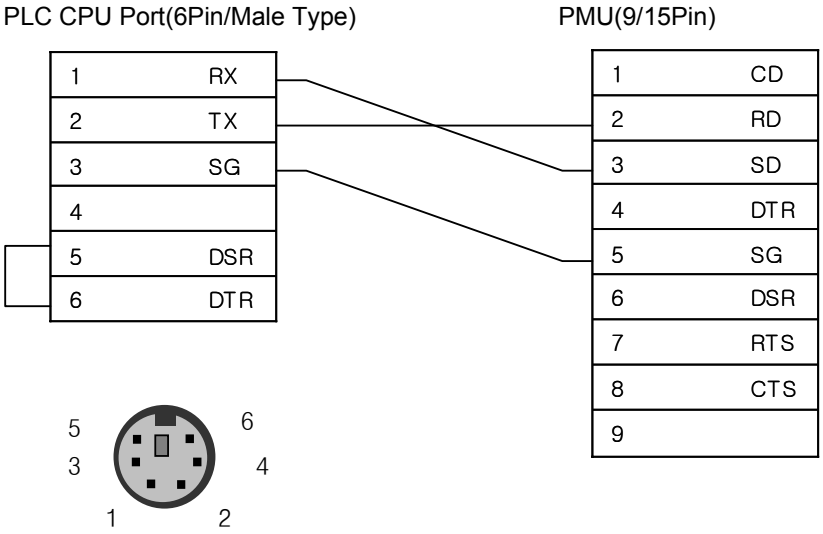
2.3.5.1 System Configuration

This figure shows system configuration to connect MESELC-Q Series to PMU.

PLC	Comm. Unit	Cable	PMU
			
Q02CPU Q02HCPU Q06HCPU Q12HCPU Q25HCPU	None	Refer to Cable Connection (RS-232)	All PMU

2.3.5.2 Cable Diagram

(1) RS-232 (MESELC-Q Series ↔ PMU (for 9/15 Pin Connector))



(View from cable connector (male))

2.3.5.3 MELSEC- Q Series Setup

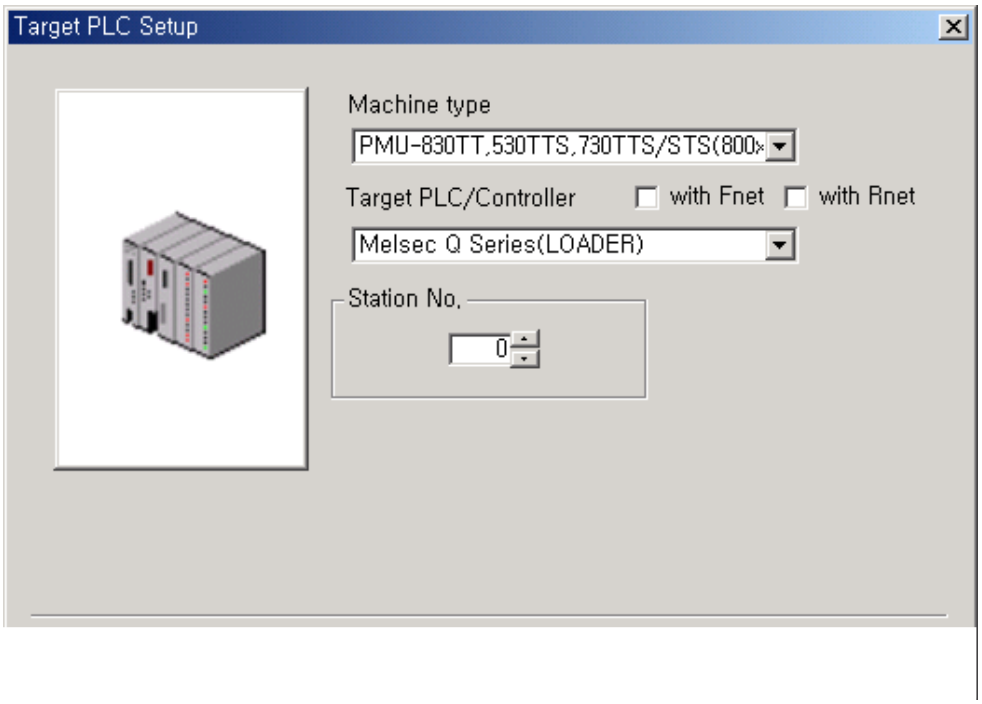
(1) Serial Parameter Setup

When using MELEC-Q series CPU direct, special serial parameter setup is not needed.

2.3.5.4 PMU Setup

(1) PMU Editor Setup

Select “MELSEC-Q Series(LOADER)” in PLC Type.



(2) PMU Serial Setup

Because default parameters is setup as follows, special serial parameter setup is not needed.

- Serial Baud Rate : 9600 ~ 115200 bps
- Serial Data Bit : 8
- Serial Stop Bit : 1
- Serial Parity Bit : ODD
- Serial Signal Level : RS-232
- Controller’s Station No. at Comm. Diagnosis(0~31) : 0

2.3.6 Available Address List

PLC's device address to enable to read/write in PMU are as following list.

(1) AJ71C24-S8, AnN CPU Direct, A1S/AOJ2/A2SH/A1SH CPU Direct

Device	Type	Bit Assign Addrs.	Word Assign Addrs
Input (X)	Bit	X0000 - X07FF	X0000 – X07F0
Output (Y)	Bit	Y0000 - Y07FF	Y0000 – Y07F0
LINK Relay (B)	Bit	B0000 - B03FF	
LINK Register (W)	Word		W0000 - W03FF
Special Relay (F)	Bit	F0000 - F0255	F0000 - F0240
LATCH Relay (L)	Bit	L0000 - L2047	
Inner Relay (M)	Bit	M0000 - M2047	M0000 - M2032
Special Relay (M)	Bit	M9000 - M9255	M9000 – M9240
Data Register (D)	Word		D0000 - D1023
Timer-Coil (TC)	Bit	TC000 - TC255	
Timer-CV (TN)	Word		TN000 - TN255
Timer-Contact (TS)	Bit	TS000 - TS255	
Counter-Coil (CC)	Bit	CC000 - CC255	
Counter-CV (CN)	Word		CN000 - CN255
Counter-Contact (CS)	Bit	CS000 - CS255	

*CV : Current Value

(2) AJ71UC24, AnA/AnU/A2US/A2USH-S1 CPU Direct

Device	Type	Bit Assign Addrs.	Word Assign Addrs
Input (X)	Bit	X0000 – X1FFF	X0000 – X1FF0
Output (Y)	Bit	Y0000 – Y1FFF	Y0000 – Y1FF0
LINK Relay (B)	Bit	B0000 – B1FFF	
LINK Register (W)	Word		W0000 – W1FFF
STEP Relay (S)	Bit	S0000 - S2047	
Special Relay (F)	Bit	F0000 – F2047	F0000 – F2032
LATCH Relay (L)	Bit	L0000 – L8191	
Inner Relay (M)	Bit	M0000 – M8191	M0000 – M8176
Special Relay (M)	Bit	M9000 - M9255	M9000 – M9240
Data Register (D)	Word		D0000 – D8191

Device	Type	Bit Assign Addrs.	Word Assign Addrs
Special Register (D)	Word		D9000 - D9255
Timer-Coil (TC)	Bit	TC000 - TC2047	
Timer-CV (TN)	Word		TN000 – TN2047
Timer-Contact (TS)	Bit	TS0000 – TS2047	
Counter-Coil (CC)	Bit	CC000 – CC1023	
Counter-CV (CN)	Word		CN000 – CN1023
Counter-Contact (CS)	Bit	CS000 – CS1023	

(3) QnA CPU Direct

Device	Type	Bit Assign Addrs.	Word Assign Addrs
Input (X)	Bit	X0000 – X1FFF	
Output (Y)	Bit	Y0000 – Y1FFF	
LINK Relay (B)	Bit	B0000 – B7FFF	B0000 – B7FF0
LINK Register (W)	Word		W0000 – W63FF
Special LINK Reg. (SW)	Word		SW000 – SW7FF
STEP Relay (S)	Bit	S00000 – S8191	S00000 – S8176
Special Relay (F)	Bit	F00000 – F32767	F00000 – F32752
LATCH Relay (L)	Bit	L00000 – L32767	L00000 – L32752
Edge Relay (V)	Bit	V00000 - V32767	V00000 – V32752
Inner Relay (M)	Bit	M00000 – M32767	M00000 – M32752
Special Relay (SM)	Bit	SM0000 – SM2047	SM0000 – SM2032
Data Register (D)	Word		D00000 – D25599
Special Register (SD)	Word		SD0000 – SD2047
Timer- Coil (TC)	Bit	TC0000 – TC22527	
Timer-CV (TN)	Word		TN0000 – TN22527
Timer-Contact (TS)	Bit	TS0000 – TS22527	
Sum Timer-Coil (SC)	Bit	SC0000 – SC22527	
Sum Timer-CV (SN)	Word		SN0000 – SN22527
Sum Timer-Contact (SS)	Bit	SS0000 – SS22527	
Counter-Coil (CC)	Bit	CC0000 – CC22527	
Counter-CV (CN)	Word		CN0000 – CN22527
Counter-Contact (CS)	Bit	CS0000 – CS22527	

(4) MELSEC-FX Series CPU Direct

Device	Type	Bit Assign Addrs.	Word Assign Addrs
Input (X)	Bit	X0000 - X0337	X0000 – X0320
Output (Y)	Bit	Y0000 – Y0337	Y0000 – Y0320
STEP Relay (S)	Bit	S0000 – S0999	
Inner Relay (M)	Bit	M0000 – M3071	
Special Relay (M)	Bit	M8000 – M8255	
Data Register (D)	Word		D0000 – D7999
Special Register (D)	Word		D8000 – D8255
Timer-CV (TN)	Word		TN000 - TN255
Timer-Contact (TS)	Bit	TS000 – TS255	
Counter-Contact (CS)	Bit	CS000 – CS255	
Counter-CV (CN)	Word		CN000 - CN255

(5) MELSEC-Q Series CPU Direct

Device	Bit Address(HEX)	Word Address(HEX)
Input Relay	X0000 - X1FFF	X0000 - X1FF0
Output Relay	Y0000 - Y1FFF	Y0000 - Y1FF0
Internal Relay	M0000 – M32767	M0000 - M32752
Special Relay	SM0000 - SM2047	SM0000 - SM2032
Latch Relay	L0000 - L32767	L0000 - L32752
Annunciator	F0000 – F32767	F0000 - F32752
Edge Relay	V0000 – V32767	V0000 - V32752
Step Relay	S0000 - S8191	S0000 - S8176
Link Relay	B0000 - B7FFF	B0000 - B7FF0
Special Link Relay	SB000 - SB7FF	SB000 - SB7F0
Timer (contact)	TS00000 - TS23087	
Timer (coil)	TC00000 - TC23087	
Aggregate Timer (contact)	SS00000 - SS23087	
Aggregate Timer (coil)	SC00000 - SC23087	
Counter (contact)	CS00000 - CS23087	
Counter (coil)	CC00000 - CC23087	

Device	Bit Address(HEX)	Word Address(HEX)
Timer (current value)		TN00000 - TN23087
Aggregate Timer (current value)		SN00000 - SN23087
Counter (current value)		CN00000 - CN23087
Data Register		D00000 - D25983
Special Data Register		SD0000 - SD2047

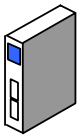
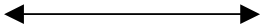
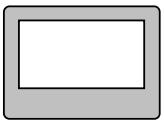
2.4 Fuji Micrex-F Series

2.4.1 Micrex-F Serial Interface

The following section describes the system configuration and interface between Fuji Micrex-F PLC and PMU by RS-232C/RS-422.

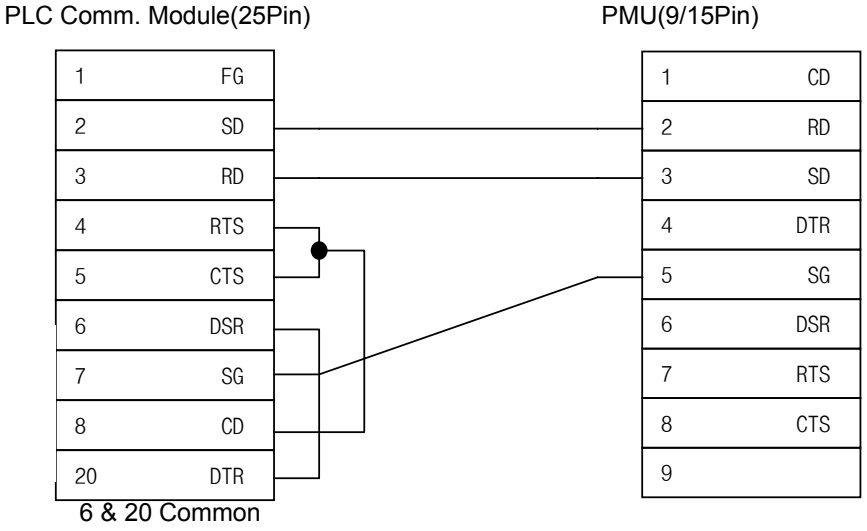
2.4.2 System Configuration

The above figure shows system configuration to connect Micrex-F PLC to PMU using serial Interface.

PLC	Comm. Module	Cable	PMU
			
F80H, F120H, F250	FFU120B	Refer to Cable Connection (RS-232C, RS-422)	All PMU
F80H, F120H, F120S, F140S, F150S, F250	FFK120A	Refer to Cable Connection (RS-232C)	

2.4.2.1 Cable Diagram

(1) RS-232C (FFU120B,FFK120A ↔ PMU (for 9/15 Pin Connector))



(2) RS-422 (FFU120B ↔ PMU (for 5Pin Terminal Block))

PLC Comm. Module (6Pin Terminal Block) — PMU (5Pin Terminal Block)

1	SDA	1	RDA
2	SDB	2	RDB
3	RDA	3	SDA
4	RDB	4	SDB
5	SG	5	SG
6	FG		

(3) RS-422 (FFU120B ↔ PMU(for 15 Pin Connector Type))

PLC Comm. Module (6Pin Terminal Block) — PMU (15Pin)

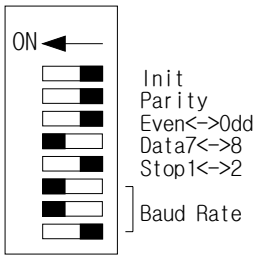
1	SDA	11	RDA
2	SDB	12	RDB
3	RDA	13	SDA
4	RDB	14	SDB
5	SG	15	SG
6	FG	16	

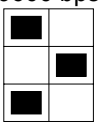
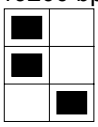
2.4.2.2 Micrex-F PLC Setup

1) Hardware Setup

① Parameter Setup

Parameters are set by Dip Switch in FFU-120B or FFK-120AA0J2-C214-S1 unit.



Switch	Setting Item	Set Switch Status	
		ON	OFF
Init *1	Initialization	Switch Set	File Set
Parity	Parity	Exist	None
Even<->Odd	Even/Odd Parity	Even	Odd
Data7<->8	Data Bit	8 Bit	7 Bit
Stop1<->2	Stop Bit	2 Bit	1 Bit
Baud Rate	Baud Rate	9600 bps 	19200 bps 

*1 Set Init Dip Switch to ‘OFF(File Set)’.

*2 BCC is set by only software.

② Mode Set(FFU-120B)

Switch	Setting Content
1	RS-232C
3	RS-485

③ In case of RS-485, set Station Number.

2) Software Set in Monitoring Communication Type

(1) Monitoring Communication Type

Monitoring Communication Type is Interface Protocol between Fuji PLC and external equipments(PMU). Through FFU120B(version 2 or above) or FFK120A(Version 2 or above), register Device address of Tag of PMU in Monitoring Area(PK Area) of Micrex-F PLC , PMU read data of PK Area in a communication frame. Therefore communication speed is improved.

(2) Restriction of Monitoring Communication

① Monitoring Communication Area(PK Area) is also used for Program-Loader, and so MAX. Monitor Point that PMU(External Equipment) can use is 433 points. 6 sets of FFU/FFK is connectable for F120H, and 3 sets for F80H in Monitoring Communication Type.(Refer following list)

PLC	Monitor Point	Num. Of FFU/FFK
F80H	433	3 sets
F120H		6 sets

1. 1 word or 1 bit is calculated as 1 monitor point.
2. Number of point and connection include Program-Loader.

② MAX. Number of Monitor Point in a Loader

Monitor/Loader	D20	D25
Ladder Monitor	Max.96 Point	Max.204 Point
Data Monitor	Max.14 Point	Max. 56 Point

③ MAX. Reg. Point of a FFU120B or FFK120A is 74 Points.

When using 2 or more sets of FFU120B in a PLC Base Rack, it is possible to use MAX. 71 points for 16bit Word and MAX. 42 points for 32bit Word.

(Calculation --> $X \times 3 + Y \times 5 \leq$: X :Number of 16bit Word , Y : Number of 32bit Word)

④ According to above ① to ③, number of system buffer for 'READ' used in a screen of PMU must be smaller than number calculated in ③ in case of using 2 or more sets of FFU120B .

⑤ If number of System Buffer for 'READ' on a Base Screen of PMU is over 74, communication speed of the screen is decreased to 1/4 by ③.

(3) FFU/FFK Initial Setting

① In order to monitor Communication, 'Init' Dip switch of FFU/FFK must be set to 'File'(Dip SW OFF).

② Setup system for FFU/FFK, write initial program and transmit it to Micrex- F PLC. A role of this program is permission of Monitoring Area (PK Area) Access. After then, other communication parameters are transmitted to PLC.

(4) System Initial Setting(Based on D20 Graphic Loader)

① Input Power

② Push 'AUX'

③ Push 'F1'key : System Definition

④ Push 'Read' key, and 'Ent' key : P-CPSL → LDR

⑤ Push 'F4' key : Registering Message Module

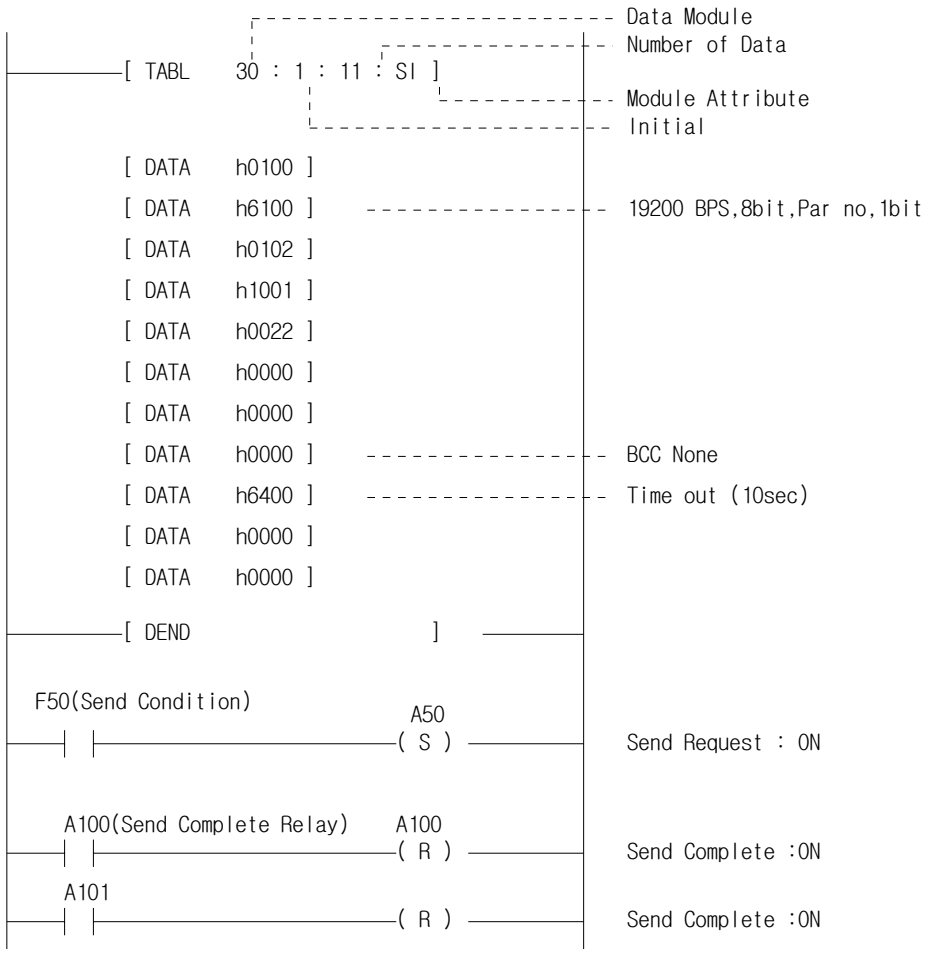
⑥ Following example shows how to use a FFU and a FFK. In this case, FFU module is established in base board slot #2, T-link No. of FFK is set as 80.
(Please refer manual of FFK120B/FFK120A)

```
            ┌--- Data Module
            ¦         ┌-- Service(0:Not Used,1:Init.,2:Send,3:Receive)
            ¦         ¦       ┌- Link(0~3:T-Link, 4~5:P-Link, 6:24, 7:SUMINET)
            ¦         ¦       ¦       ┌-- Capsule No.
            ¦         ¦       ¦       ¦       ┌-- Channel
No          ¦         ¦       ¦       ¦       ¦
00        30          1       0       02      0
01        31          1       0       80      0
02
.
.
.
```

⑦ Push 'F10' key

⑧ Push 'Load' key, and 'Ent' key : Save

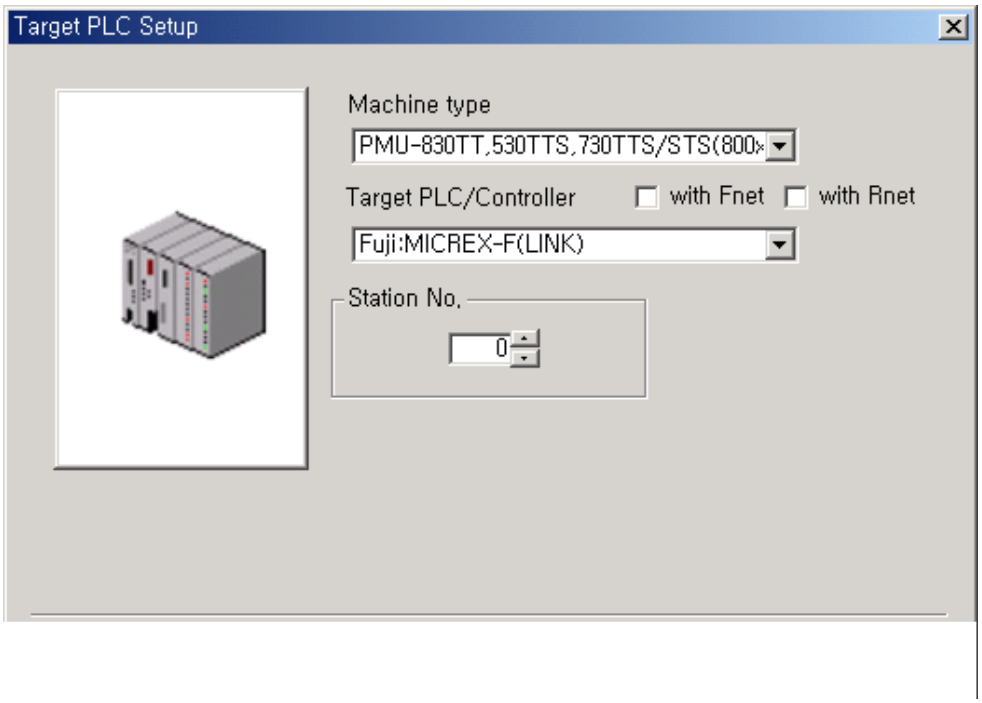
(5) Example of Init. Set Program



2.4.2.3 PMU Setup

(1) PMU Editor Setup

Select “Fuji:MICREX-F(LINK)”in Controller Type.



(2) PMU Serial Setup

Settings are as follows.

- Serial Baud Rate : Set same as PLC’s setting
- Serial Data Bit : Set same as PLC’s setting
- Serial Stop Bit : Set same as PLC’s setting
- Serial Parity Bit : Set same as PLC’s setting
- Serial Signal Level : Set same as PLC’s setting
- Controller’s Station No. at Comm. Diagnosis(0~31) : In case of RS-485, set same as PLC’s setting and ‘0’for RS-232C

2.4.3 Available Address List

Following list is MICREX-F PLC's Address to enable to read/write in PMU.

(1) Usable address in FFU-120B/FFK-120A

Device	Dev.No	Type	Size	MOLNO	ATTR
In/Out (B)	0	Word	16	00	01
Aux. Relay (M)	1	Word	16	01	01
KEEP Relay (K)	2	Word	16	02	01
Special Relay (F)	3	Word	16	03	01
Announce Relay (A)	4	Word	16	04	01
P-Link Memory (L)	5	Word	16	14	01
Timer-SV (TS)	6	Word	32	0A	02
Timer-CV (TR)	7	Word	32	0B	02
Counter-SV (CS)	8	Word	32	0C	02
Counter-CV (CR)	9	Word	32	0D	02
Data Memory (BD)	10	Word	32	0E	02

CV: Current Value, SV: Set Value

(2) Address Setting Rang up to PLC

Device/PLC	F50/F50H	F60	F80H	F120H	F120S/F140S/F 150S
B	WB0099	WB0099	WB0399	WB0399	WB0511
M	WM0031	WM0127	WM0255	WM0255	WM0511
K	WK0031	WK0063	WK0063	WK0063	WK0063
F	WF0029	WF0029	WF0067	WF0109	WF0125
A	WA0019	WA0019	WA0021	WA0021	WA0045
L	-	-	-	WL0511	WL0511
TS	TS0127	TS0255	TS0255	TS0255	TS0511
TR	TR0127	TR0255	TR0255	TR0255	TR0511
CS	CS0031	CS0127	CS0255	CS0255	CS0511
CR	CR0031	CR0127	CR0255	CR0255	CR0511
BD	BD0127	BD0255	BD0255	BD0255	BD0255

File Memory is based on 16 bit. All File memory check the range based on Max. assignable size.

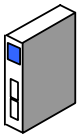
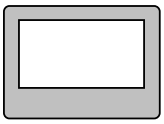
2.5 Samsung FARA / NAiS Series

2.5.1 FARA-N70α/700/700α/7000 PLC Serial Interface

The following section describes the system configuration and interface between Samsung FARA-N70α/700α, NAiS PLC and PMU by RS-232C/RS-422.

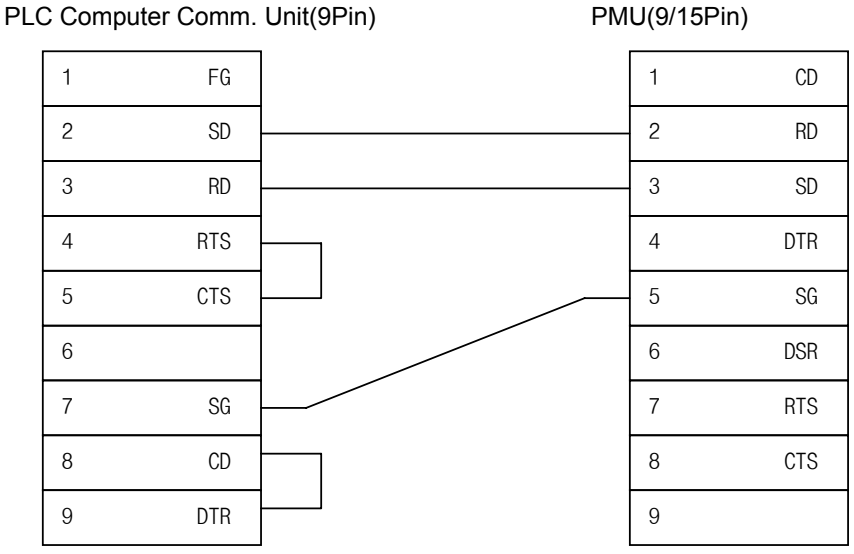
2.5.1.1 System Configuration

The above figure shows system configuration to connect FARA-N PLC to PMU.

PLC	Comm. Module	Cable	PMU
			
FARA-N70α/700/700α /7000, NAiS	N-7000 CCU N-700 CCU	Refer to Cable Connection (RS-232C)	All PMU

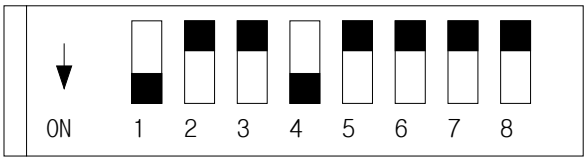
2.5.1.2 Cable Diagram

(1) RS-232C (FARA-N70α/700/700α/7000, NAiS ↔ PMU(for 9/15 Pin Connector))



2.5.1.3 FARA , NAiS PLC Setup

PLC Communication Setting is set by Dip SW in Computer Communication Unit for RS-232C interfacing to PMU.



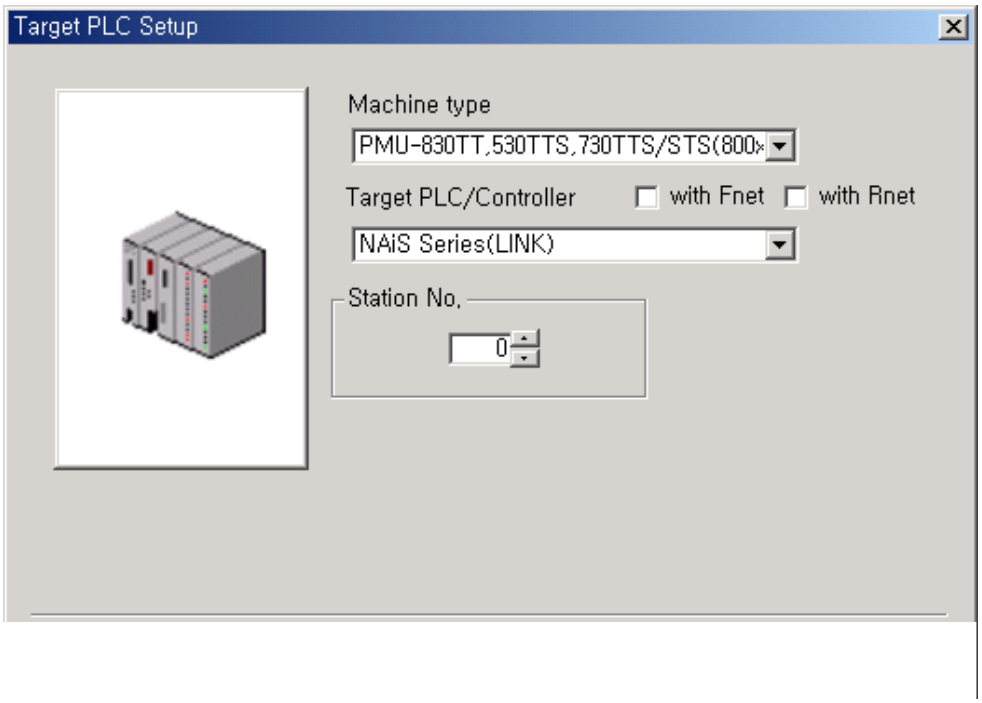
Switch	Setting Item	Set Switch Status							
		ON				OFF			
	Baud Rate(bps)	300	600	1200	2400	4800	9600	19200	Modem
SW1	Baud Rate Set	ON	OFF	ON	OFF	ON	OFF	ON	OFF
SW2		ON	ON	OFF	OFF	ON	ON	OFF	OFF
SW3		ON	ON	ON	ON	OFF	OFF	OFF	OFF
SW4	Data Bit	8 Bit				7 Bit			
SW5	Parity	Exist				None			
SW6	Even/Odd Parity	Even				Odd			
SW7	Stop Bit	2 Bit				1 Bit			
SW8	Control Signal	CTS,CD Available				CTS,CD Not Available			

Caution SW8(Control Signal) is set to ‘OFF(CTS,CD Not Available)’.

2.5.1.4 PMU Setup

(1) PMU Editor Setup

Select “NAiS(LINK)” of “FARA Series” in PLC type.



(2) PMU Serial Setup

Serial settings are as follows

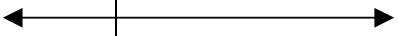
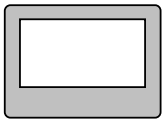
- Serial Baud Rate : Same as controller’s setting.
- Serial Data Bit : Same as controller’s setting.
- Serial Stop Bit : Same as controller’s setting.
- Serial Parity Bit : Same as controller’s setting.
- Serial Signal Level : Same as controller’s setting.
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s setting in case of RS-422, and ‘0’for RS-232C.

2.5.2 FARA-N70 α/700/700 α/7000, NAiS PLC CPU Direct

The following section describes the system configuration and interface between Samsung FARA-N70 α/700/700 α/7000, NAiS PLC and PMU by CPU direct.

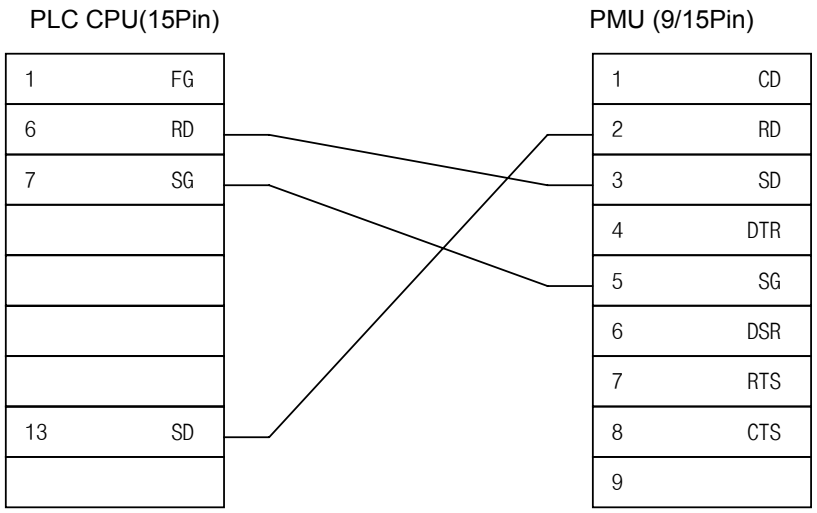
2.5.2.1 System Configuration

The above figure shows system configuration to connect FARA-N70 α/700/700 α/7000 PLC to PMU.

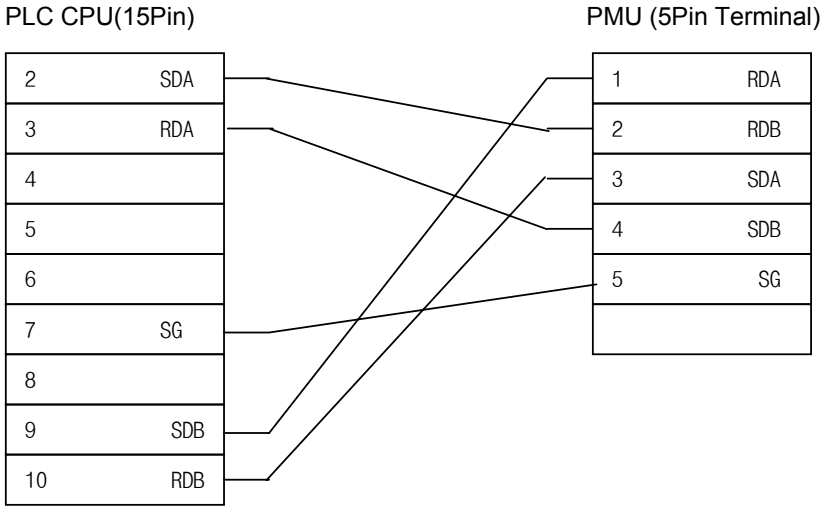
PLC	Comm. Unit	Cable	PMU
			
FARA-N70 α /700/700 α /7000, NAiS	None	Refer to Cable Connection. (RS-232C)	All PMU

2.5.2.2 Cable Diagram

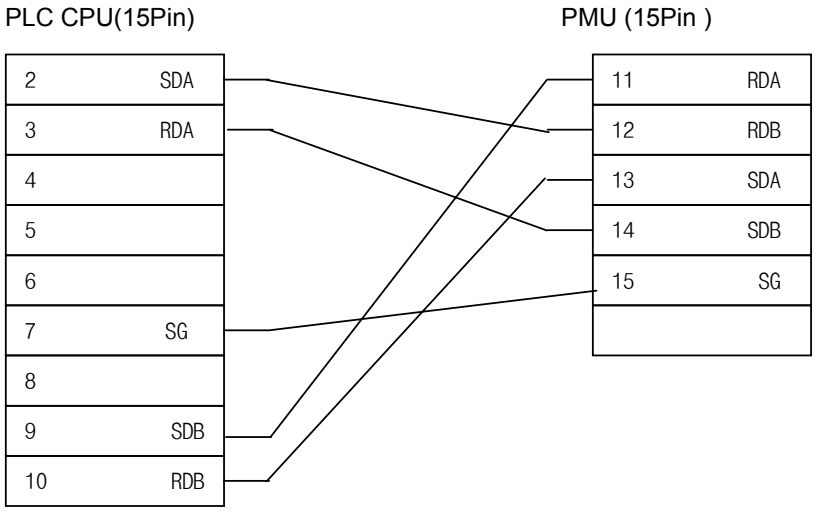
(1) RS-232C (FARA-N700/7000, NAiS ↔ PMU(for 9/15 Pin Connector))



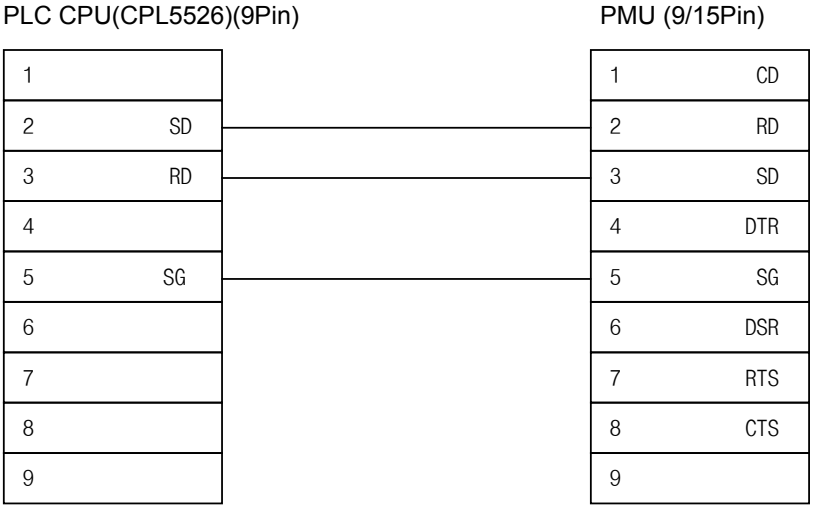
(2) RS-422 (FARA-N700/7000, NAiS Series ↔ PMU (for 5Pin Terminal Block))



(3) RS-422 (FARA-N700 α ↔ PMU(for 15 Pin Connector))



(4) RS-232C (FARA-N70 α ↔ PMU(for 9/15 Pin Connector)



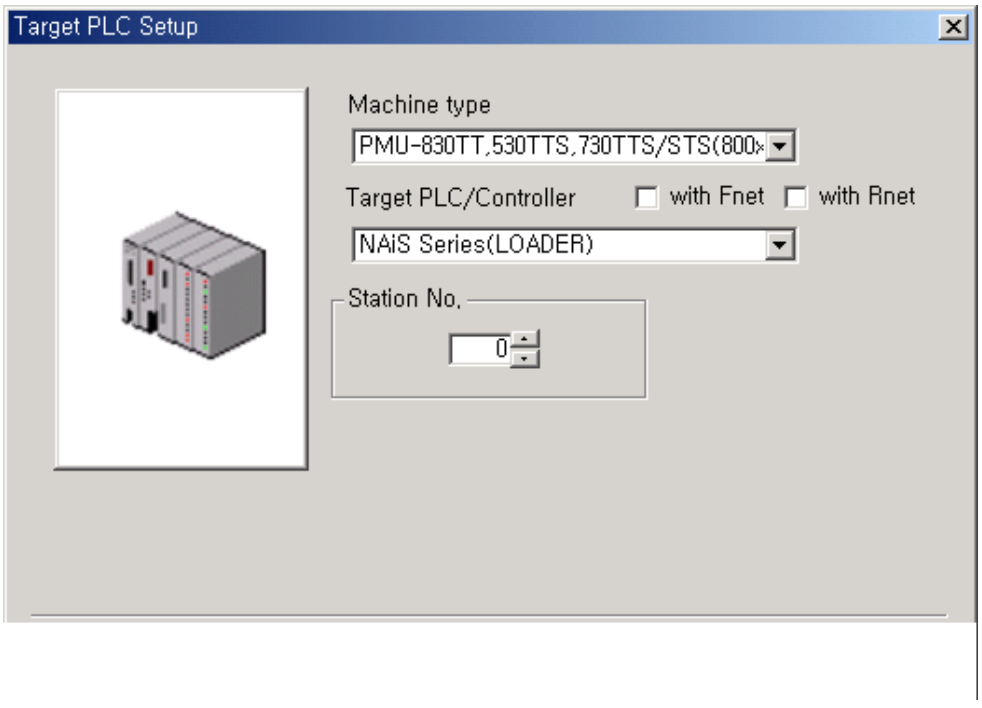
2.5.2.3 FARA-N PLC Setup

You don't need special settings in FARA-N70 α/700/700 α/7000 PLC.

2.5.2.4 PMU Setup

(1) PMU Editor Setup

Select "Samsung Fara-N(LOADER)" of "FARA Series" in PLC Type.



(2) PMU Serial Setup

Special Settings are not needed. Automatic Settings are as follows.

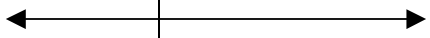
- Serial Baud Rate : 9600/19200bps
- Serial Data Bit : 8bit.
- Serial Stop Bit : 1bit
- Serial Parity Bit : Odd
- Serial Signal Level : RS-232C
- Controller's Station No. at Comm. Diagnosis(0~31) : assigned to '0'.

2.5.3 FARA-N70Plus/700Plus PLC CPU Direct

The following section describes the system configuration and interface between Samsung FARA-N70Plus/700Plus PLC and PMU by CPU direct.

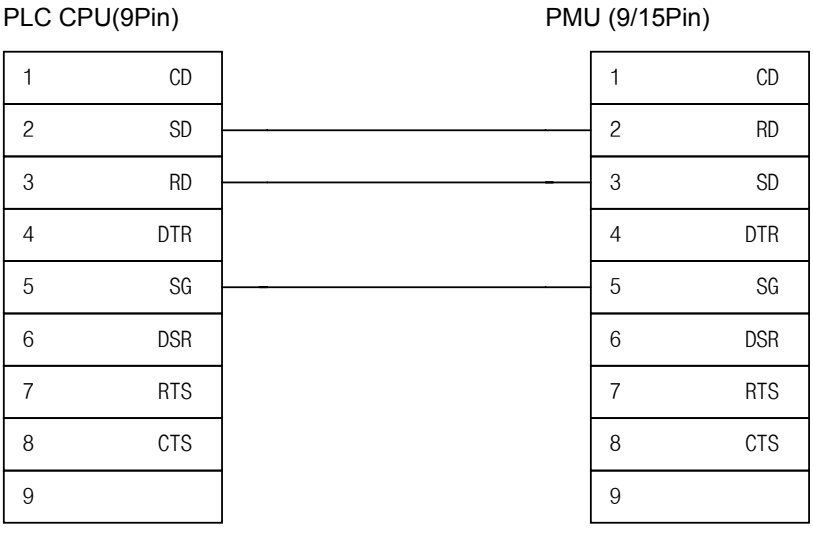
2.5.3.1 System Configuration

The above figure shows system configuration to connect FARA-N70PLUS/700PLUS PLC to PMU

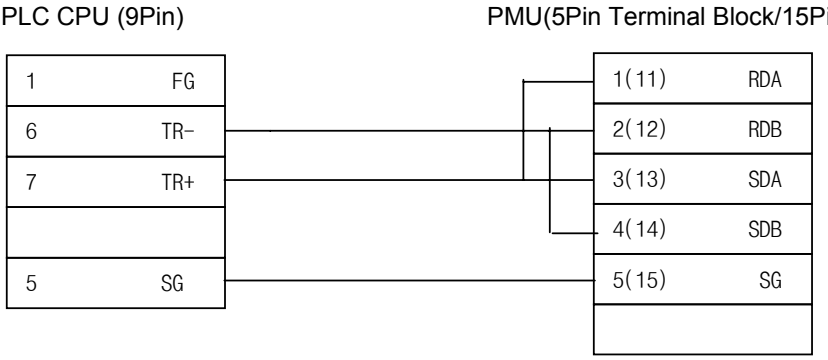
PLC	Comm. Unit	Cable	PMU
			
FARA-N70PLUS/700PLUS	None	Refer to Cable Connection.	All PMU

2.5.3.2 Cable Diagram

(1) RS-232C (FARA-N70PLUS/700PLUS ↔ PMU(for 9/15 Pin Connector)



(2) RS-422 (FARA-N70PLUS/700PLUS ↔ PMU(for 5Pin Terminal Block or 15Pin Connector))



2.5.3.3 FARA-N70PLUS/700PLUS PLC Setup

PLC Setting	
Baud Rate	9600 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	NONE
Error Detection	CRC

Station Address is set by Rotary Switch of the rear of CPU module.

- Dip switch setting

DIP 1

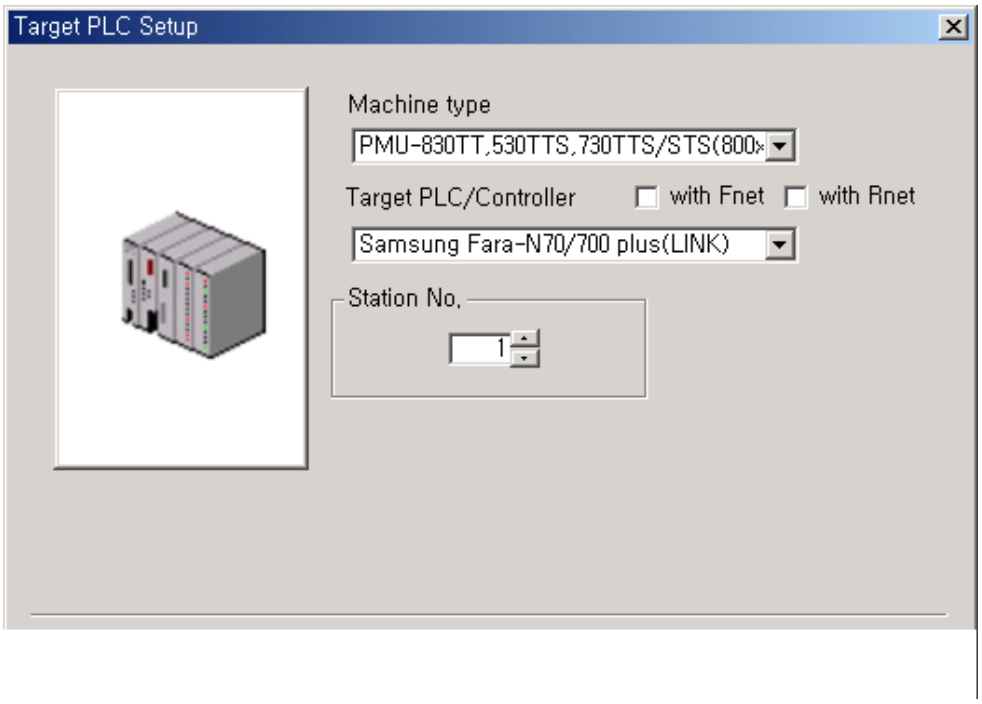
DIP 2

Dip1	1	OFF/RSAM	ON/FLASH	Dip2	1.2	ON
	2	OFF/RS232C	ON/RS485		RS485 Terminator Resister	
	3/4	OFF/OFF	9600 bps			
	3/4	ON/ON	4800 bps			
	3/4	OFF/ON	19200 bps			
	3/4	ON/OFF	38400 bps			

2.5.3.4 PMU Setup

(1) PMU Editor Setup

Select “Samsung FARA-N70/700PLUS(Link)” in PLC Type.



(2) PMU Serial Setup

Special Settings are not needed. Automatic Settings are as follows.

- Serial Baud Rate : 9600bps
- Serial Data Bit : 8bit.
- Serial Stop Bit : 1bit
- Serial Parity Bit : None
- Serial Signal Level : RS-232C
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as Station Address .

2.5.4 Available Address List

(1) Fara-N70 α /700/700 α /7000

Operand	Name	Data Type	Num. Of Point	Number
X	External Input Relay	Bit	4096	0 ~ 255F *1
Y	External Output Relay	Bit	4096	0 ~ 255F *1
R	Inner Relay	Bit	14016	0 ~ 875F *1
L	Link Relay	Bit	10240	0 ~ 639F *1
R	Special Relay	Bit	176	9000 ~ 910F *1
T/C	Timer/Counter Contact	Bit	2048	0~2047
DT	Data Register	Word	10000	0 ~9999
FL	File Register	Word	32765	0 ~ 32764
Ld	Link Register	Word	8478	0 ~ 8477
DT	Special Register	Word	256	9000 ~ 9255
SV	Timer/Counter SV	Word	2048	0 ~ 2047
EV	Timer/Counter EV	Word	2048	0 ~ 2047
IX/IY	Index Register	Word	2	IX/IY

*SV: Set Value, EV : Elapse Value

*1 : X,Y,R,L are available Bit/Word process.
In case of bit process, 1 unit is 'HEXA', from 10unit is Decimal. (Ex : X12C)
In case of Word process, express Word by attaching 'W' in front of device. (Ex : WX12 = 16bit data of X120~X12F)

(2) Fara-N70PLUS/700PLUS

Device	Address
External Input/Output	R0000 ~ R0127
LINK Relay	L0000 ~ L0063
Aux. Relay	M0000 ~ M0127
KEEP Relay	K0000 ~ K0127
Special Relay	F0000 ~ F0015
Link Data	W0000 ~ W2047
T/C SV	SV000 ~ SV255
T/C CV	PV000 ~ PV255

* SV : Set Value, CV : Current Value

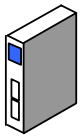
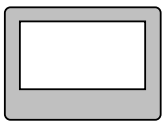
2.6 OMRON SYSMAC Series

2.6.1 OMRON SYSMAC-C Serial Interface

The following section describes the system configuration and interface between OMRON SYSMAC-C PLC and PMU using RS-232C/422 Serial Communication.

2.6.1.1 System Configuration

The above figure shows system configuration to connect SYSMAC-C PLC to PMU.

외부기기	통신 유닛	케이블	본 기기
			
C200H/C200HS	C200H-LK202-V1	Refer to cable diagram (RS-422)	ALL PMU
	C200H-LK201-V1	Refer to cable diagram (RS-232)	
C500/C1000H/ C2000H/C500	C500-LK201-V1 C500-LK203	Refer to cable diagram (RS-232/ 422)	
C50/C120/C500/ C1000H/C2000H /C120F/C500F	C120-LK201-V1	Refer to cable diagram (RS-232)	
	C120-LK202-V1	Refer to cable diagram (RS-422)	
CPM1A/CPM2A (block Type)	CPM1-CIF01	Refer to cable diagram (RS-232)	
	CPM1-CIF11	Refer to cable diagram (RS-422)	
CPM2C (Card Type)	CPM2C-CIF01	Refer to cable diagram (RS-232)	
	CPM2C-CIF11	Refer to cable diagram (RS-232/ RS-422)	

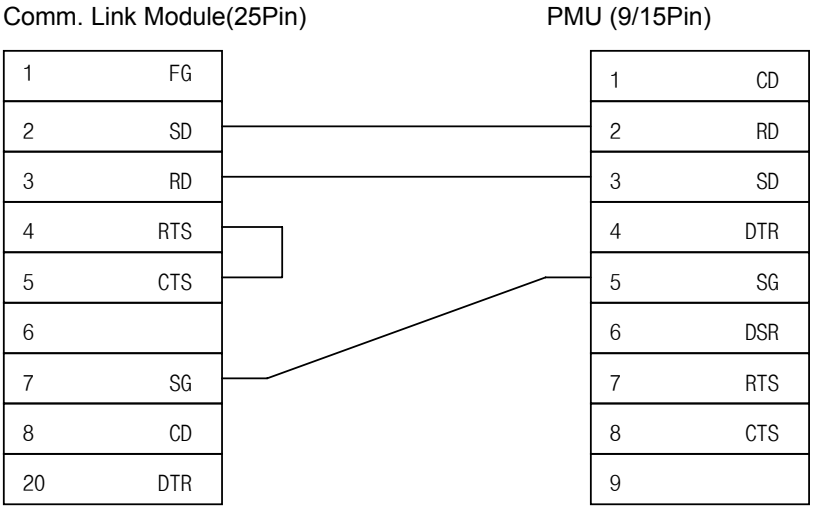
Caution

Be cautious that Communication Unit of C200H/C200HS differs from other in connector pin spec.
(Refer connection diagram (2),(4))

2.6.1.2 Cable Diagram

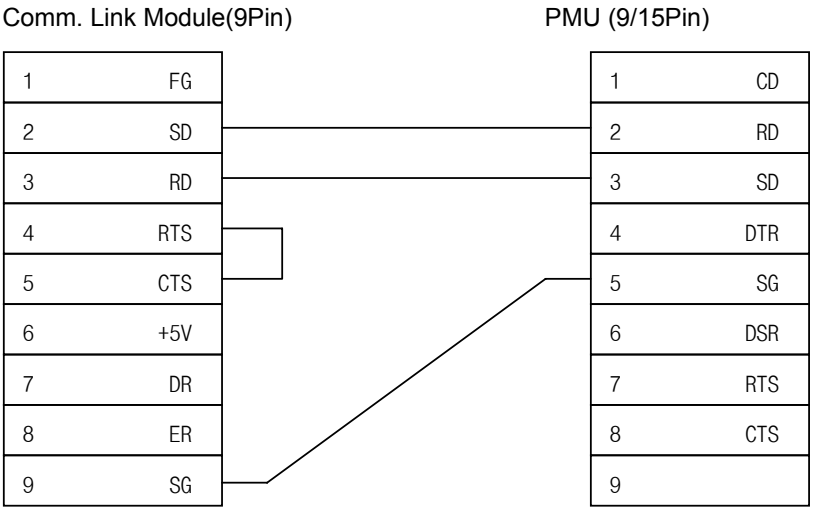
(1) RS-232C (SYSMAC-C ↔ PMU (for 9/15 Pin Connector)

This is connection diagram for SYSMAC-C PLCs except C200, CPM1A, 2A, 2C.



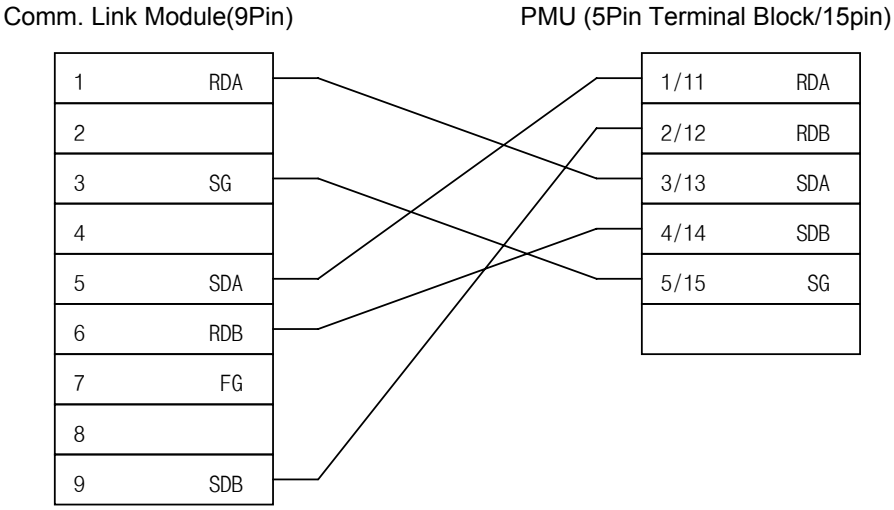
(2) RS-232C (SYSMAC-C200 ↔ PMU (for 9/15 Pin Connector)

This is connection diagram for SYSMAC-C C200.



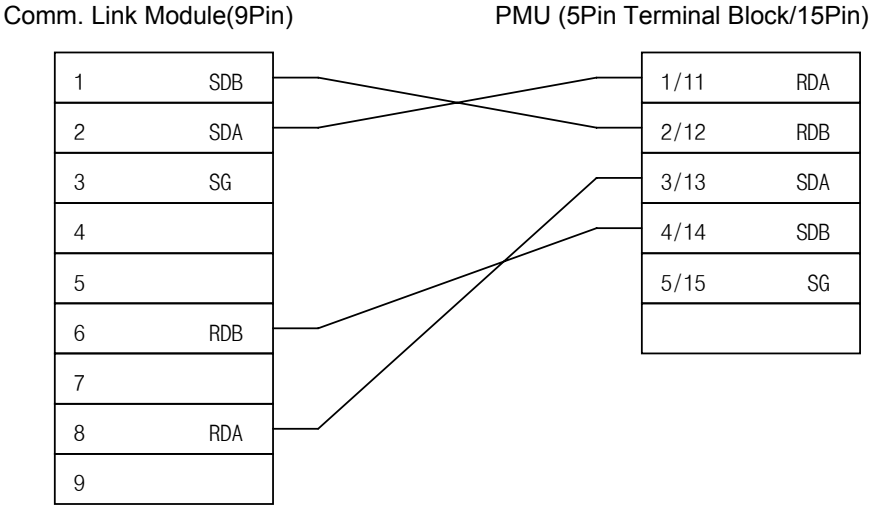
(3) RS-422 (SYSMAC-C ↔ PMU (for 5Pin Terminal Block or 15Pin Connector)

This is connection diagram for SYSMAC-C PLCs except C200.



(4) RS-422 (SYSMAC-C200 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))

This is connection diagram for SYSMAC-C PLC C200.



2.6.1.3 SYSMAC-C PLC Setup

(1) C200H-LK201-V1/LK-202-V1 Setup

1) Set station number.

Station Number is set by SW1 and SW2. SW1 is X10, SW2 is X1.

2) Baud Rate Setting

Set by SW3. Setting values according to SW Set are as follows.

Switch	Baud Rate(bps)
0	300
1	600
2	1200
3	2400
4	4800
5	9600
6	19200

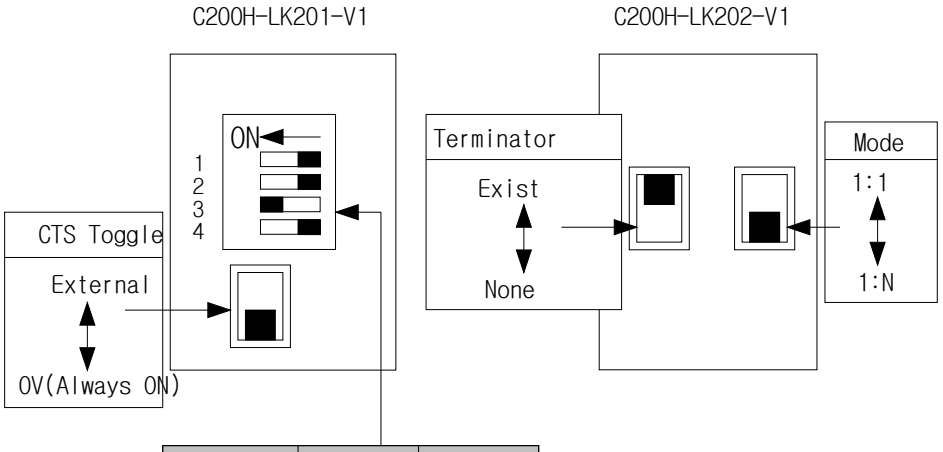
3) Command Level Setting

Set by SW4. Recommend 2.

Switch	Command Level	Parity	Etc.
0	Level 1 available	even	ASCII 7bit
1	Level 1,2 available		2 Stop bit
2	Level 1,2,3 available		
3	Disable setting		
4	Level 1 available	odd	
5	Level 1,2 available		
6	Level 1,2,3 available		
7	Disable setting		
8	Level 1 available	even	JIS 8bit
9	Level 1,2 available		1 Stop bit
A	Level 1,2,3 available		
B	Disable setting		
C	Level 1 available	odd	

Switch	Command Level	Parity	Etc.
D	Level 1,2 available		
E	Level 1,2,3 available		
F	Disable setting		

4) DIP Switch Setting

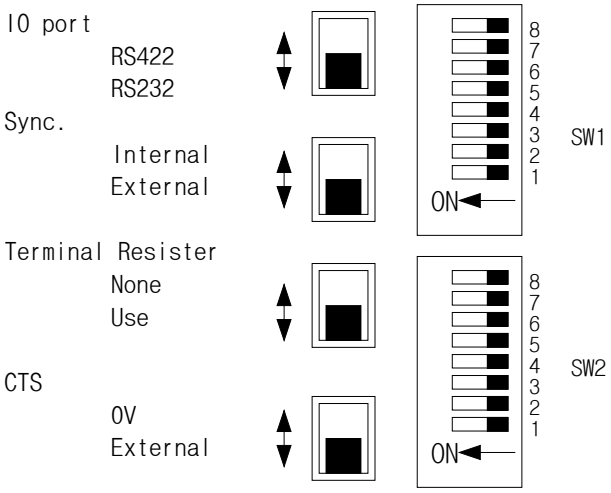


SW No.	ON	OFF
1	OFF Fixed	
2	OFF Fixed	
3	1:N	1:1
4	5V Supply	None

REF.

Recommended Setting is CTS 0V(On), 1:N, Terminator Exist.

(2) C500-LK201-V1 Dip Switch Setup

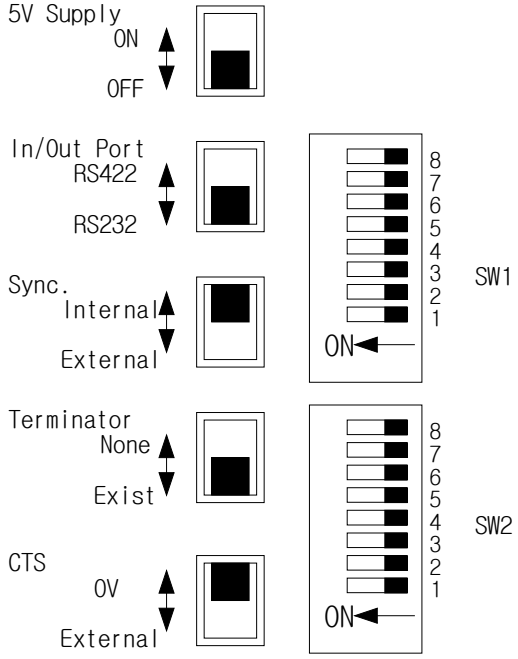


	Switch	Setting Item	Setting Switch Status						
			ON			OFF			
SW1	1~5	Assign Station Num.	0	1	2	…	30	31	
	1	Station Num. Setting	OFF	ON	OFF	…	OFF	ON	
	2		OFF	OFF	ON	…	ON	ON	
	3		OFF	OFF	OFF	…	ON	ON	
	4		OFF	OFF	OFF	…	ON	ON	
	5		OFF	OFF	OFF	…	ON	ON	
	6	Not Used							
	7	Not Used							
	8	Power On PLC Mode	Run			Stop			
SW2	1~4	Baud Rate	300	600	1200	2400	4800	9600	19200
	1	Baud Rate Setting	OFF	ON	OFF	ON	OFF	ON	OFF
	2		ON	OFF	OFF	ON	ON	OFF	OFF
	3		OFF	OFF	OFF	ON	ON	ON	ON
	4		ON	ON	ON	OFF	OFF	OFF	OFF
	5	Not Used							
	6	Mode	1:1			1:N			
	7~8	Command Level	1		1	1,2		1,2,3	
	7	CMD Level setting	OFF		ON	OFF		ON	
	8		OFF		OFF	ON		ON	

REF. Other recommended settings are Internal Sync., Terminator, CTS OV.

REF. Fixed to Parity Even, Data Bit 7, Stop Bit 2.

(3) C500-LK203 Dip Switch Setting

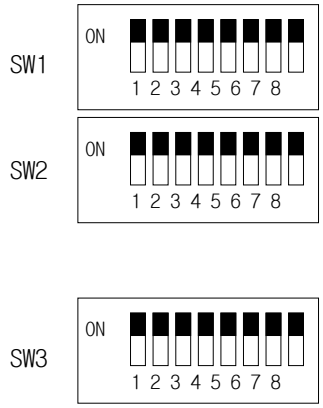


	Switch	Setting Item	Set Switch Status					
			ON			OFF		
SW1	1~5	Assign Station Num.	0	1	2	…	30	31
	1	Station Num. Setting	OFF	ON	OFF	…	OFF	ON
	2		OFF	OFF	ON	…	ON	ON
	3		OFF	OFF	OFF	…	ON	ON
	4		OFF	OFF	OFF	…	ON	ON
	5		OFF	OFF	OFF	…	ON	ON
	6~7	Parity & Code						
	6	Transmission Code	ASCII 7bt, 2 Stop bit			JIS 8bit, 1 Stop bit		
	7	Parity	Even			Odd		
	8	Power On PLC Mode	Monitor			Normal		

	Switch	Setting Item	Set Switch Status						
			ON			OFF			
SW2	1~4	Assign Baud Rate	300	600	1200	2400	4800	9600	19200
	1	Baud Rate Setting	OFF	ON	OFF	ON	OFF	ON	OFF
	2		ON	OFF	OFF	ON	ON	OFF	OFF
	3		OFF	OFF	OFF	ON	ON	ON	ON
	4		ON	ON	ON	OFF	OFF	OFF	OFF
	5	Select System	System#0			System#1			
	6	Mode	1:1			1:N			
	7~8	Command Level	1		1	1,2		1,2,3	
	7	Command Level Setting	OFF		ON	OFF		ON	
	8		OFF		OFF	ON		ON	

Other recommended settings are Internal Sync., Terminator, CTS OV.

(4) C120-LK201-V1/LK-202-V1 Setting



	Switch	Setting Item	Set Switch Status						
			ON			OFF			
SW1	1~5	Assign Station Num.	0	1	2	…	30	31	
	1	Station Num. Setting	OFF	ON	OFF	…	OFF	ON	
	2		OFF	OFF	ON	…	ON	ON	
	3		OFF	OFF	OFF	…	ON	ON	
	4		OFF	OFF	OFF	…	ON	ON	
	5		OFF	OFF	OFF	…	ON	ON	
	6	Not Used							
	7	Not Used							
	8	Power On PLC Mode	Run			Stop			
SW2	1~4	Assign Baud Rate	300	600	1200	2400	4800	9600	19200
	1	Baud Rate Setting	OFF	ON	OFF	ON	OFF	ON	OFF
	2		ON	OFF	OFF	ON	ON	OFF	OFF
	3		OFF	OFF	OFF	ON	ON	ON	ON
	4		ON	ON	ON	OFF	OFF	OFF	OFF
	5	Not Used							
	6	Mode	1:1			1:N			
	7~8	Command Level	1		1	1,2		1,2,3	
	7	Command Level	OFF		ON	OFF		ON	
	8	Setting	OFF		OFF	ON		ON	

C120-LK201-V1 differs from C120-LK202-V1 in SW3.

① C120-LK201-V1

	Switch	Setting Item	Set Switch Status	
	1~2	CTS Setting	CTS Always ON	External CTS
	1		ON	OFF
	2		OFF	ON
	3~6	Sync. Type	Internal Sync.	External Sync.
	3		ON	OFF
	4		OFF	ON
	5		ON	OFF
	6		OFF	ON
	7	Not Used		
	8	Not Used		

② C120-LK202-V1

	Switch	Setting Item	Set Switch Status	
	1~2	Terminator	Exist	None
	1		ON	ON
	2		OFF	OFF
	3		ON	OFF
	4		OFF	OFF
	5		ON	OFF
	6		OFF	OFF
	7	Not Used		
	8	Not Used		

Recommended Settings are Internal Sync., Terminator, CTS OV .

During communication, Mode of PLC must be ‘MONITOR’. Otherwise, ‘Write’ to PLC is not available.

If Data Memory(DM6600) is set to 0101h, PLC Mode is ‘MONITOR’.

DM6600 is available to be changed in only ‘PROGRAM’ mode.

(5) C200HW-COM06 Setup

This is setting for OMRON C200 PLC.

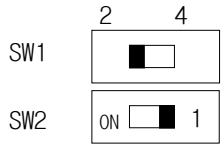
Settings use internal DM area. (Refer PLC manual in detail.)

Default Settings are RS232C, 9600, 7bit, 2bit, even.

Caution During communication, Mode of PLC must be 'MONITOR'. Otherwise, 'Write' to PLC is not available.

This is how to use communication unit for RS-422.

Following dip switch is located inner of C200HW-COM06.



RS422/RS485 in case of 2-wire type

SW1 : Set 2 SW2 : Set 1

RS422/RS485 in case of 4-wire type

SW1 : Set 4 SW2 : Set 'ON'

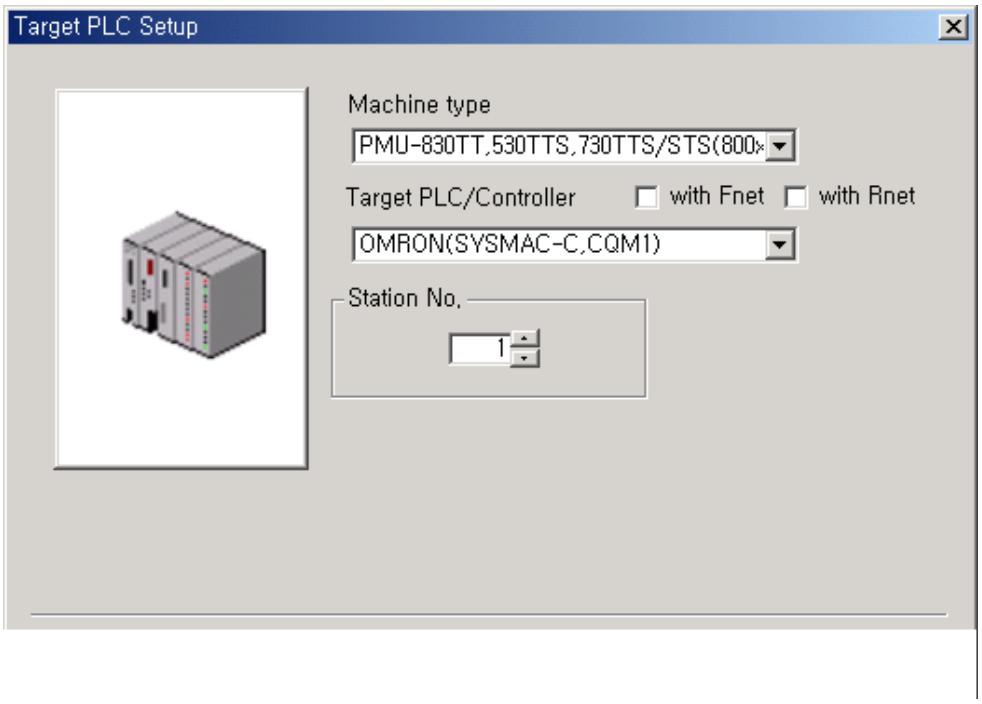
In case interfacing to PMU by RS-422, set 4-wire type.

(Refer PLC manual for RS-422 settings.)

2.6.1.4 PMU Setup

(1) PMU Editor Setup

Select “OMRON(SYSMAC-C,CQM1)” of “OMRON Series” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

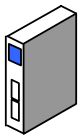
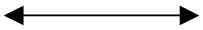
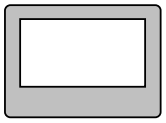
- Serial Baud Rate : Same as controller’s setting.
- Serial Data Bit : Same as controller’s setting.
- Serial Stop Bit : Same as controller’s setting.
- Serial Parity Bit : Same as controller’s setting.
- Serial Signal Level : Same as controller’s setting.
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s setting

2.6.2 OMRON CPM1A / 2A Serial Interface

The following section describes the system configuration and interface between OMRON SYSMAC-C PLC and PMU using RS-232C/422 Serial Communication.

2.6.2.1 System Configuration

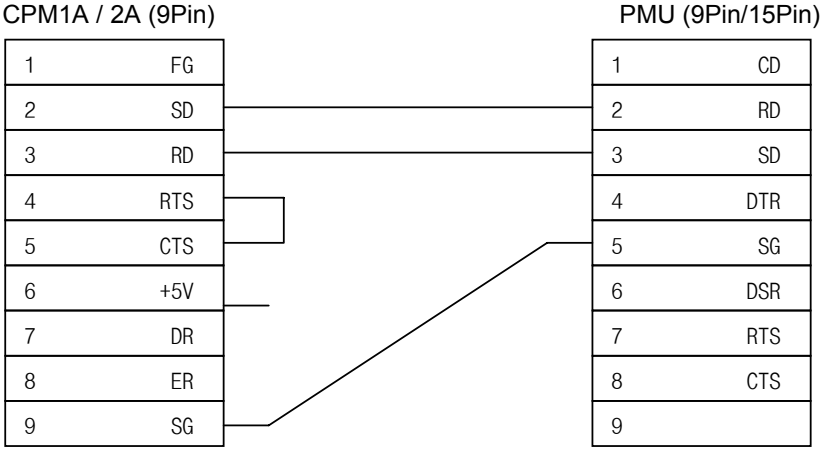
The above figure shows system configuration to connect SYSMAC-CPM1A/2A Type PLC to PMU.

<table>
<tr><th>PLC</th><th>Comm. Unit</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td>  </td><td>  </td><td>  </td></tr>
<tr><td rowspan="2">CPM1A/
CPM2A
(block Type)</td><td>CPM1-CIF01</td><td>Refer to cable diagram(RS-232C)</td><td rowspan="4">ALL PMU</td></tr>
<tr><td>CPM1-CIF11</td><td>Refer to cable diagram(RS-422)</td></tr>
<tr><td rowspan="2">CPM2C
(Card Type)</td><td>CPM2C-CIF01</td><td>Refer to cable Diagram(RS-232C)</td></tr>
<tr><td>CPM2C-CIF11</td><td>Refer to cable Diagram(RS-232C/RS-422)</td></tr>
</table>

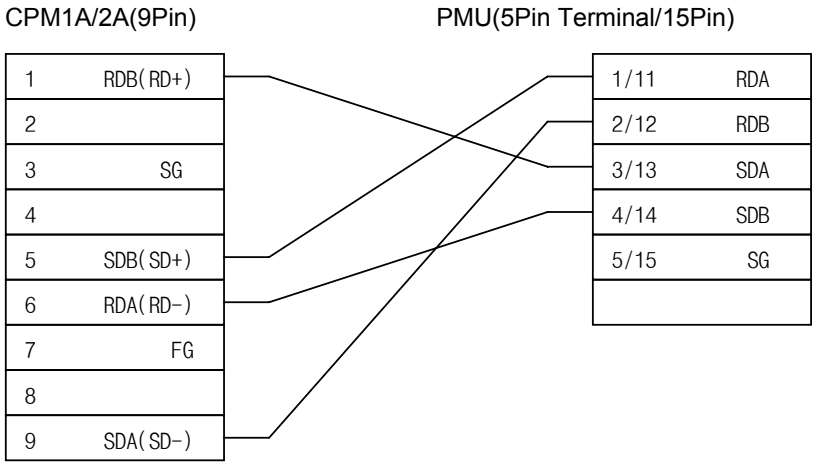
2.6.2.2 Cable Diagram

(1) RS-232C (CPM1A/2A ↔ PMU for 9/15 Pin Connector)

This is connection diagram for CPM1A / 2A type



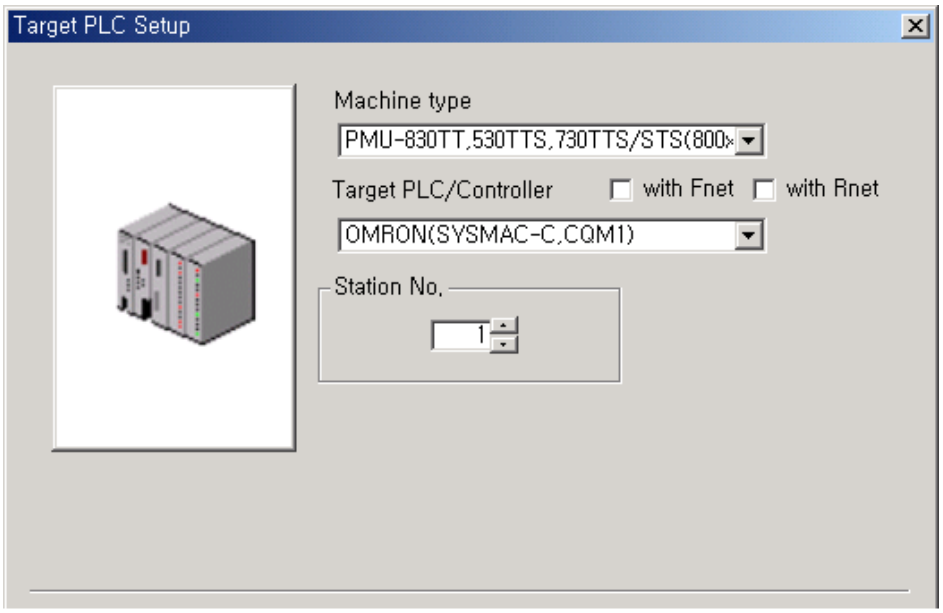
(2) RS-422 (CPM1A/2A ↔ PMU)



2.6.2.3 PMU Setup

(1) PMU Editor Setup

Select “OMRON(SYSMAC-C,CQM1)” of “OMRON Series” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : Same as controller's setting.
- Serial Data Bit : Same as controller's setting.
- Serial Stop Bit : Same as controller's setting.
- Serial Parity Bit : Same as controller's setting.
- Serial Signal Level : Same as controller's setting.
- Controller's Station No. at Comm. Diagnosis(0~31) : Same as controller's setting

2.6.2.4 Communication parameter setup for PLC

(1) Communication settings of CPM2A

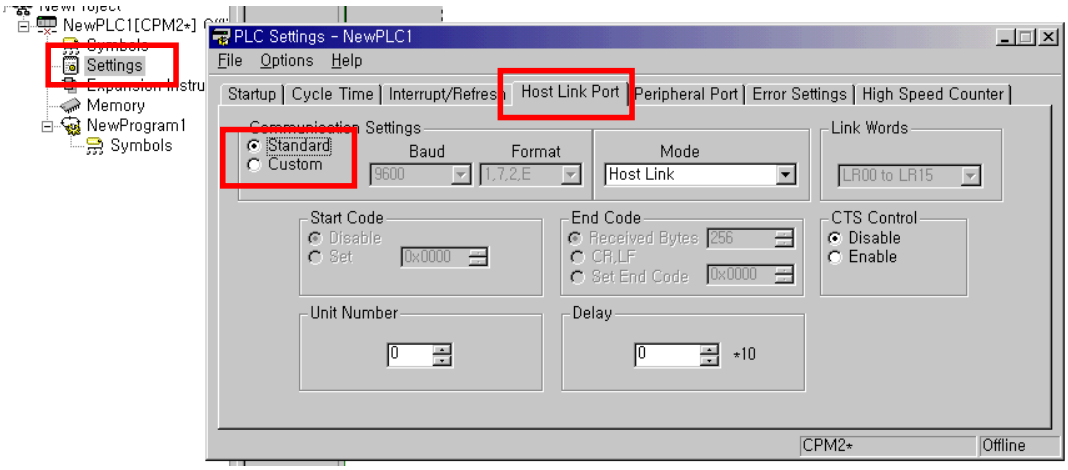
In order to communicate with PMU, communication parameters for CPM2A CPU has to be set using PLC software, CX-Programmer as following :

- Execute PLC software, CX-Programmer and select "Settings" => "Host Link Port" menu.
- There are two options to select for communication settings, "Standard" and "Custom".

If you choose "Standard" of Communication Setting, communication parameters such as Baud, format have default parameters. Default parameters are as following :

- Baud Rate : 9600 bps
- Data bit : 7 bit
- Stop bit : 2 bit
- Parity bit : Even

If you choose "Custom" of Communication Settings, you can set communication parameter as you want. The below figure shows the example of Communication Settings for CPM2A CPU using PLC software, CX-Programmer.



(2) Communication settings of CPM1A

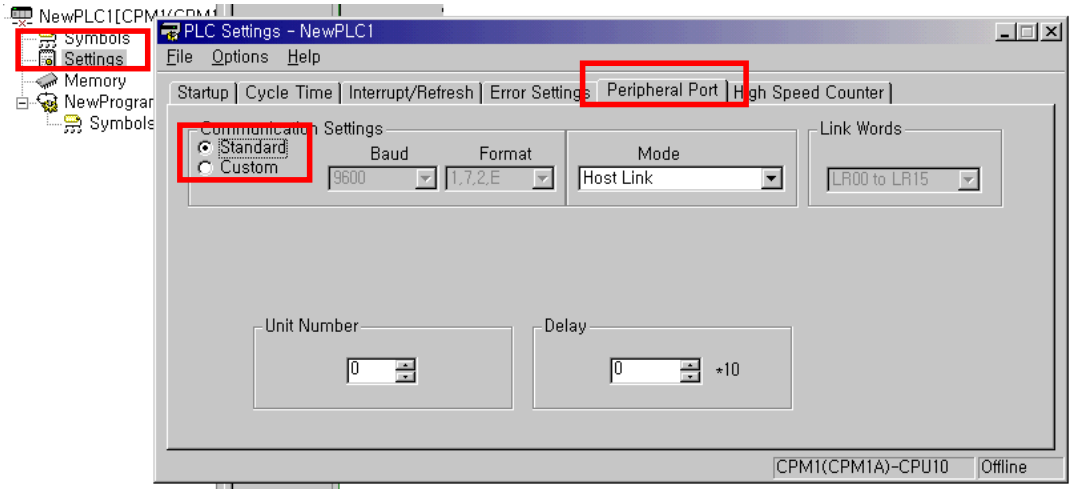
In order to communicate with PMU, communication parameters for CPM1A CPU has to be set using PLC software, CX-Programmer as following :

- Execute PLC software, CX-Programmer and select “Settings” => “Peripheral Port” menu.
- There are two options to select for communication settings, “Standard” and “Custom”.

If you choose “Standard” of Communication Setting, communication parameters such as Baud, format have default parameters. Default parameters are as following :

- Baud Rate : 9600 bps
- Data bit : 7 bit
- Stop bit : 2 bit
- Parity bit : Even

If you choose “Custom” of Communication Settings, you can set communication parameter as you want. The below figure shows the example of Communication Settings for CPM1A CPU using PLC software, CX-Programmer.


NewPLC1[CPM1/CPM
Symbols
Settings
Memory
NewPrograr
Symbols
PLC Settings - NewPLC1
File Options Help
Startup Cycle Time Interrupt/Refresh Error Settings Peripheral Port High Speed Counter
Communication Settings
Standard
Custom
Baud
9600
Format
1,7,2,E
Mode
Host Link
Link Words
LR00 to LR15
Unit Number
0
Delay
0
*10
CPM1(CPM1A)-CPU10
Offline

2.6.3 Available Address List

(1) SYSMAC C Series(Common)

Dev	Input	50,120(F),500(F)	2000H, 200H(S), 1000H(F)
Data Link	LR	0~31	0~63
Latch Relay	HR	0~31	0~99
Timer	TIM	0~127	0~511
Counter	CNT	0~127	0~511
Data Memory	DM	Refer following List.	
Aux. Memory	AR	None	0~27
I/O Relay	CH	0~63	0~255 (0~511:200HS)

(DM Area)

C50,120,500	0~511
C200H	0~1999
C200HS	0~9999
1000H	0~4096
2000H	0~6655
120F	0~511
500F	0~4095
1000HF	0~4095

* Bit ON/OFF control is available in LR,HR,AR,CH.

(2) SYSMAC CV Series

Dev	Input	CV
Data Link Relay		1000~1199
Special Hold Relay	A	000~511
Timer(Current Value)	T	0~1023
Counter(Current Value)	C	0~1023
Data Memory	D	0~9999
Internal Aux. Relay		1900~2299
I/O Relay		000~199

.

(3) SYSMAC CS1 Series

Dev	Addr	CS1
Index Register	IR	0~15
Task Flag(TK)	TK	0~30
Data Register	DR	0~15
Timer(CV)	T	0~4095
Counter(CV)	C	0~4095
Data Memory	D	00000~32767
Internal AUX. Relay	W	0~511
Channel I/O	CIO	0~6143
Hold Relay	H	0~511
Special Auxiliary Relay	A	0~959
Exp. Data Memory(E0~EC)	E0~EC	0~32767
Exp. Data Memory(Current Bank)	EM	0~32767

CV : Current Value

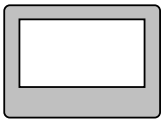
2.7 Allen-Bradley PLC

2.7.1 SLC500 PLC CPU Direct

The following section describes the system configuration and interface between Allen-Bradley(AB) SLC500 PLC and PMU using RS-232C through PLC's Loader port.

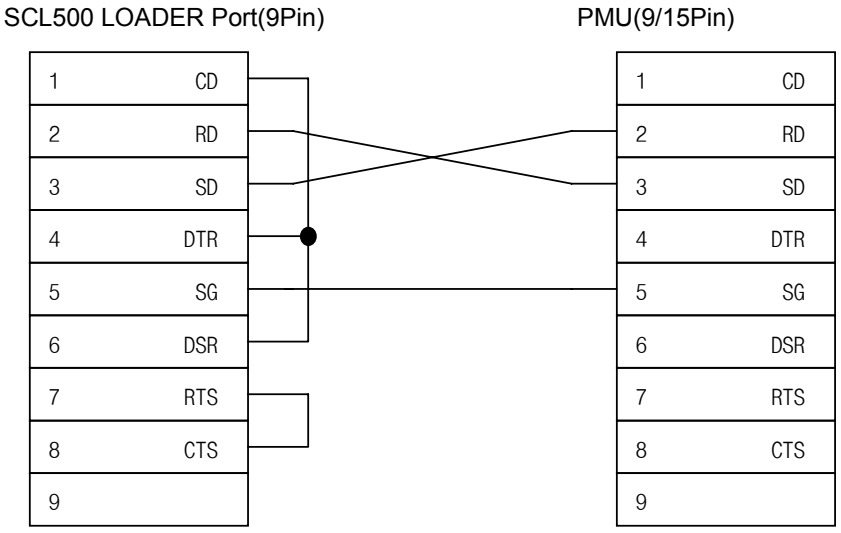
2.7.1.1 System Configuration

The above figure shows system configuration to connect AB SLC500 PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
SLC5/03 SLC5/04	None	Refer to Cable Connection. (RS-232C)	All PMU

2.7.1.2 Cable Diagram

(1) RS-232C (SLC500 ↔ PMU (for 9/15 Pin Connector)



2.7.1.3 SLC500 PLC Setup

Recommended settings are 19200 bps, data 8 bit, stop bit 1, Parity Even.

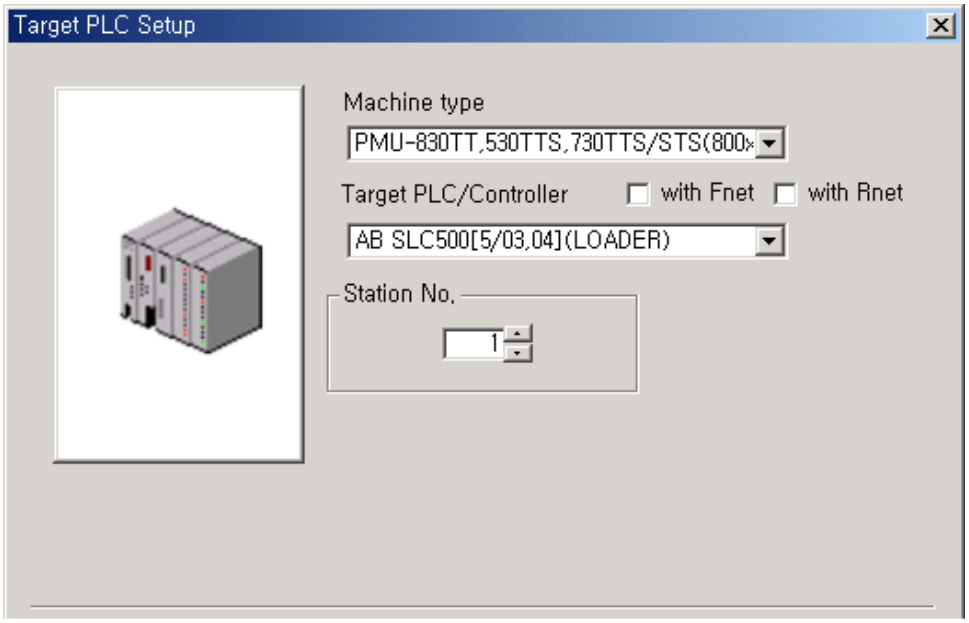
PLC settings	
Baud Rate	19200 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	EVEN
Communication Driver	DF1 Full Duplex Slave
Duplicate Packet Detection	Disable
Error Detection	BCC
Control Line	No Handshaking
Station Address	0

PLC's Station Address and PMU's station num. must be same.

2.7.1.4 PMU Setup

(1) PMU Editor Setup

Select "SLC500[5/03,04](LOADER)" of "AB Series" in PLC type.



(2) PMU Serial Setup

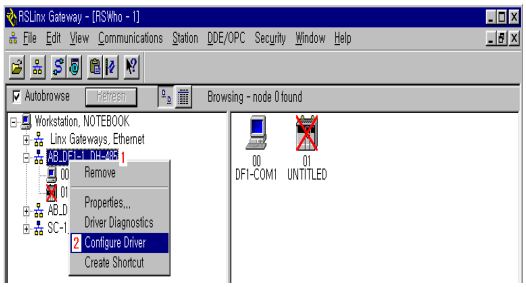
Serial Settings are as follows.

- Serial Baud Rate : Same as controller's setting.
- Serial Data Bit : Same as controller's setting.
- Serial Stop Bit : Same as controller's setting.
- Serial Parity Bit : Same as controller's setting.
- Serial Signal Level : Same as controller's setting.
- Controller's Station No. at Comm. Diagnosis(0~31) : Same as controller's setting

2.7.1.5 Communication parameters setup for SLC500[5/03,05]

In this section, the method to set communication parameters for SLC500[5/03,05] using PLC software, RSLinx and RSLogix is described.

(1) Firstly, execute AB PLC software, RSLinx, in which user can make sequential software and connect AB PLC. The below figure shows main screen of RSLinx. In order to set parameters to connect PC, select 'Configure Driver' menu with clicking right button of mouse.

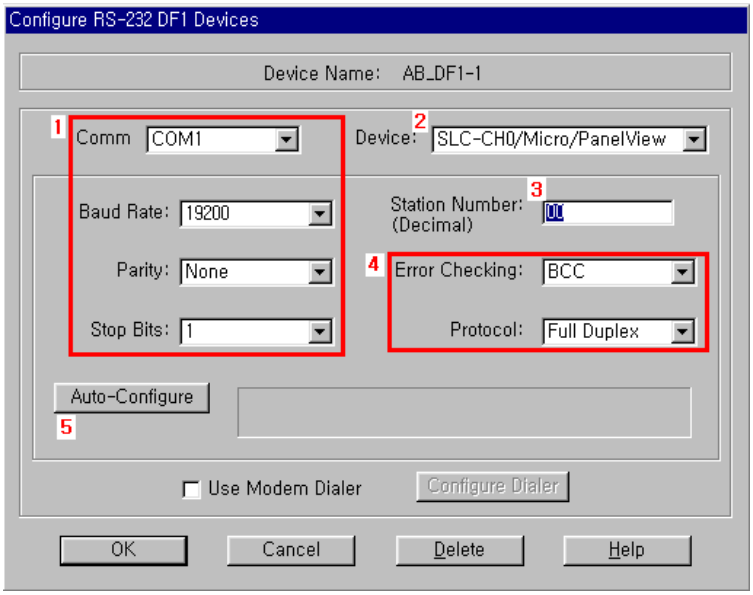


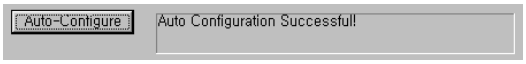
(2) In Configure Driver menu, user can set parameters. The recommended parameters are as follows:

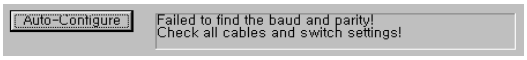
- Baud Rate : 19200 bps
- Parity : None
- Stop bit : 1
- Error checking : BCC
- Protocol : Full Duplex

After setting parameters, press ‘Auto-Configure’ button.

If configuration setup is successful, the message of “Auto Configuration successful” will be display in text box.

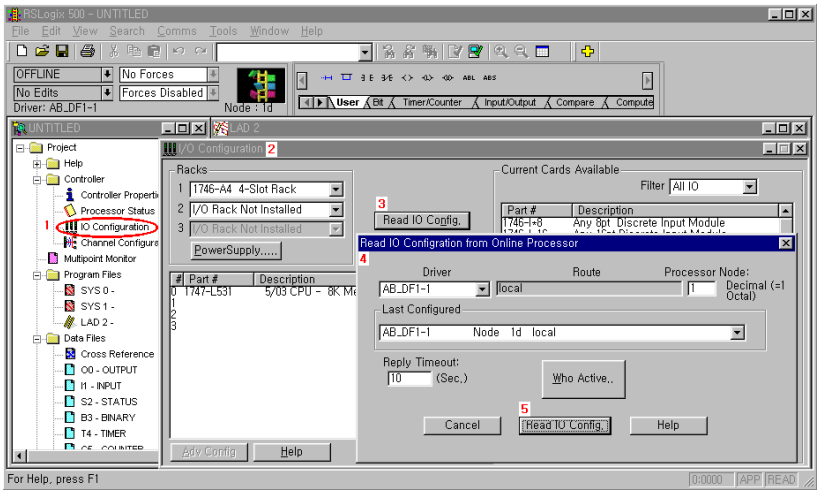




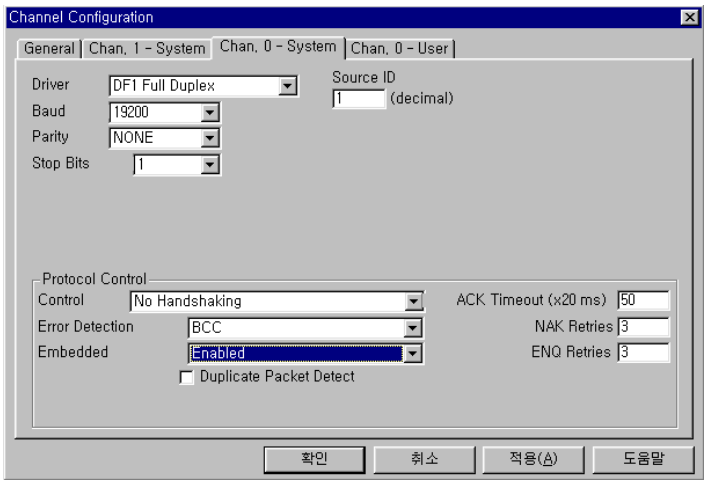


(3) After auto-configuration, execute RSLogix 500 English, in which user can set parameters to communicate with PMU

After choose CPU type, press ‘OK’ button.



(4) In project screen, select ‘Channel Configuration’ in order to set communication parameters of SLC500[5/03,05]



The recommended parameter of SLC500[5/03,05] are as follows :

- Driver : DF1 Full Duplex
- Baud : 19200 bps
- Parity : None
- Stop Bit : 1
- Control : No handshaking
- Error detection : BCC
- Embedded : Enabled
- Source ID : 1

Caution

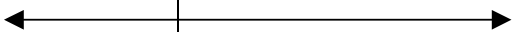
Driver of “DF1 Full Duplex” can be supported in firmware version 2.3. In case of firmware version 2.2 of PMU machine, user must set driver as “DF1 Half Duplex”.

2.7.2 PLC-5 PLC CPU Direct

The following section describes the system configuration and interface between Allen-Bradley(AB) PLC-5 PLC and PMU using RS-232C through PLC's Loader port.

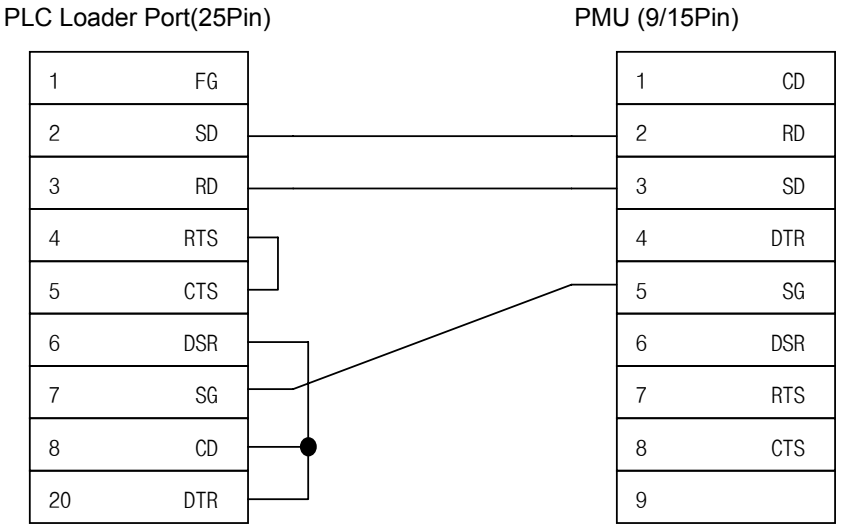
2.7.2.1 System Configuration

The above figure shows system configuration to connect PLC-5 PLC to PMU.

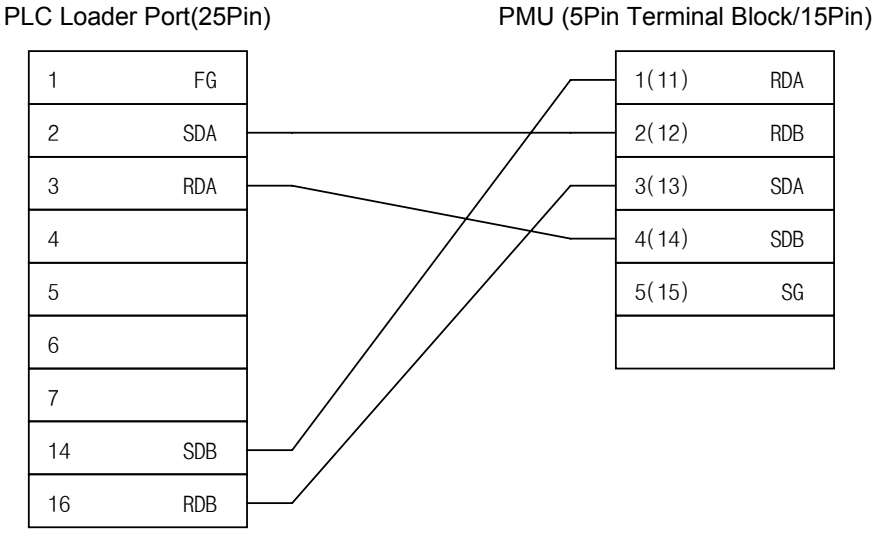
PLC	Comm. Unit	Cable	PMU
			
PLC-5/11 PLC-5/20 PLC-5/30 PLC-5/40 PLC-5/40L PLC-5/60 PLC-5/60L	None	Refer to Cable Connection. (RS-232C, RS-422)	All PMU

2.7.2.2 Cable Diagram

(1) RS-232C (PLC-5 ↔ PMU (for 9/15Pin Connector)



(2) RS-422 (PLC-5 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector)



2.7.2.3 PLC-5 PLC Setup

Recommended settings are 19200 bps, data 8 bit, stop bit 1, parity Even.

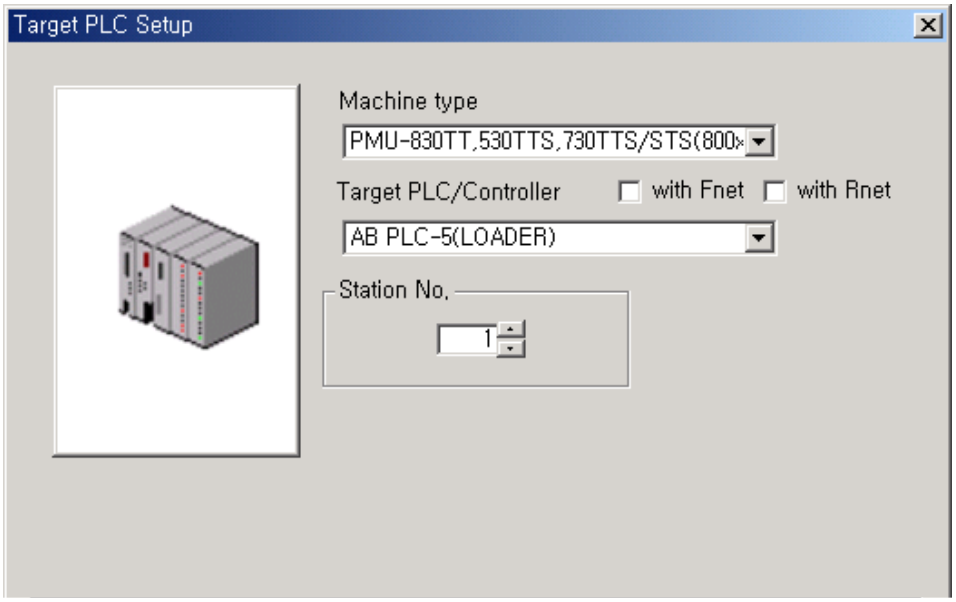
PLC Settings	
Baud Rate	19200 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	EVEN
Communication Driver	DF1 Half Duplex Slave
Duplicate Packet Detection	Disable
Error Detection	BCC
Control Line	No Handshaking
Station Address	0

PLC Station Address and PMU Station number must be same.

2.7.2.4 PMU Setup

(1) PMU Editor Setup

Select “PLC-5(LOADER)”of “AB Series” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : Same as controller’s setting.
- Serial Data Bit : Same as controller’s setting.
- Serial Stop Bit : Same as controller’s setting.
- Serial Parity Bit : Same as controller’s setting.
- Serial Signal Level : Same as controller’s setting.
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s setting

2.7.3 Available Address List

(1) SLC500 Series

Device	어드레스
Bit	B0003000 ~ B0003255 , B0010000 ~ B0255255
Timer(Timing Bit) *1	TC004000 ~ TC004255 , TC010000 ~ TC255255
Timer(End Bit) *1	TC004000 ~ TC004255 , TC010000 ~ TC255255
Timer(SV)	TP004000 ~ TP004255 , TP010000 ~ TP255255
Timer(CV)	TA004000 ~ TA004255 , TA010000 ~ TA255255
Counter(Up Counter) *2	CC005000 ~ CC005255 , CC010000 ~ CC255255
Counter(Down Counter) *2	CC005000 ~ CC005255 , CC010000 ~ CC255255
Counter(End Bit) *2	CC005000 ~ CC005255 , CC010000 ~ CC255255
Counter(SV)	CP005000 ~ CP005255 , CP010000 ~ CP255255
Counter(CV)	CA005000 ~ CA005255 , CA010000 ~ CA255255
Integer	N0007000 ~ N0007255 , N0010000 ~ N0255255

SV : Set Value, CV : Current Value

*1 : Timing Bit : 14
End Bit : 13
*2 : Un Counter Enable Bit : 15
Down Count Timing Bit : 14
End Bit : 13

(2) PLC-5 Series

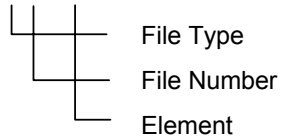
Device	Address
Input Relay	I0001000 ~ I0001999
Output Relay	O0000000 ~ O0000999
Internal Relay	B0003000 ~ B0099999
Timer(Timing Bit) *1	TC003000 ~ TC099999
Timer(End Bit) *1	TC003000 ~ TC099999
Timer(SV)	TP003000 ~ TP099999
Timer(CV)	TA003000 ~ TA099999
Counter(Up Counter) *2	CC003000 ~ CC099999
Counter(Down Counter) *2	CC003000 ~ CC099999
Counter(End Bit) *2	CC003000 ~ CC099999
Counter(SV)	CP003000 ~ CP099999
Counter(CV)	CA003000 ~ CA099999
Integer	N0003000 ~ N0099999

*1 : Timing Bit : 14
End Bit : 13
*2 : Up Count Enable Bit : 15
End Bit : 13

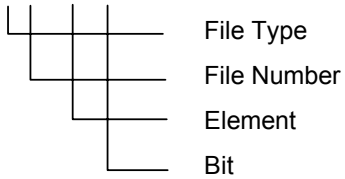
<Addressing for AB PLC>

<< AB >>

N 7 : 15

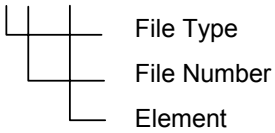


B 3 : 64/15

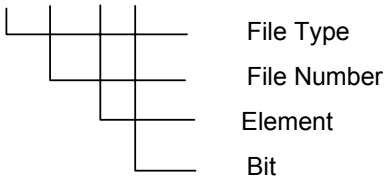


<< PMU >>

N 007 015



B 003 064 15



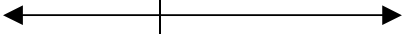
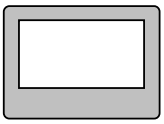
2.8 Modicon Series

2.8.1 Modicon Modbus Serial Interface

The following section describes the system configuration and interface between Modicon Modbus PLC and PMU using RS-232C.

2.8.1.1 System Configuration

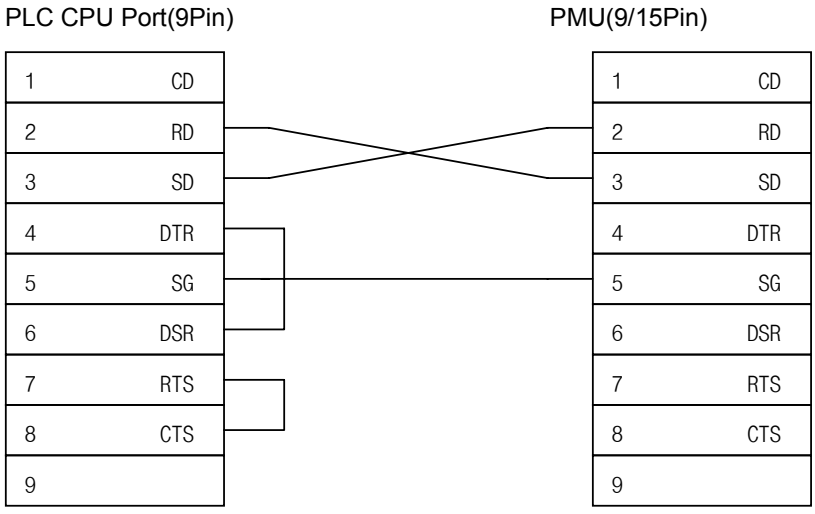
The above figure shows system configuration to connect Modicon Modbus PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
884, 984A, 984B 984X, Slot Mount- 984	None	Refer to Cable Connection.(RS-232C)	All PMU

In case of Modbus, Link I/F Port of CPU Module is used.

2.8.1.2 Cable Diagram

(1) RS-232C (Modicon ↔ PMU (for 9/15Pin Connector)



2.8.1.3 Modicon PLC Setup

Comm. Mode of PLC is set to RTU Mode.

PLC Settings	
Baud Rate	9600 bps
Data Length	8 bit
Stop Bit	1 bit
Parity	EVEN
Error Detection	CRC

Comm. Mode of PLC is set to ASCII Mode.

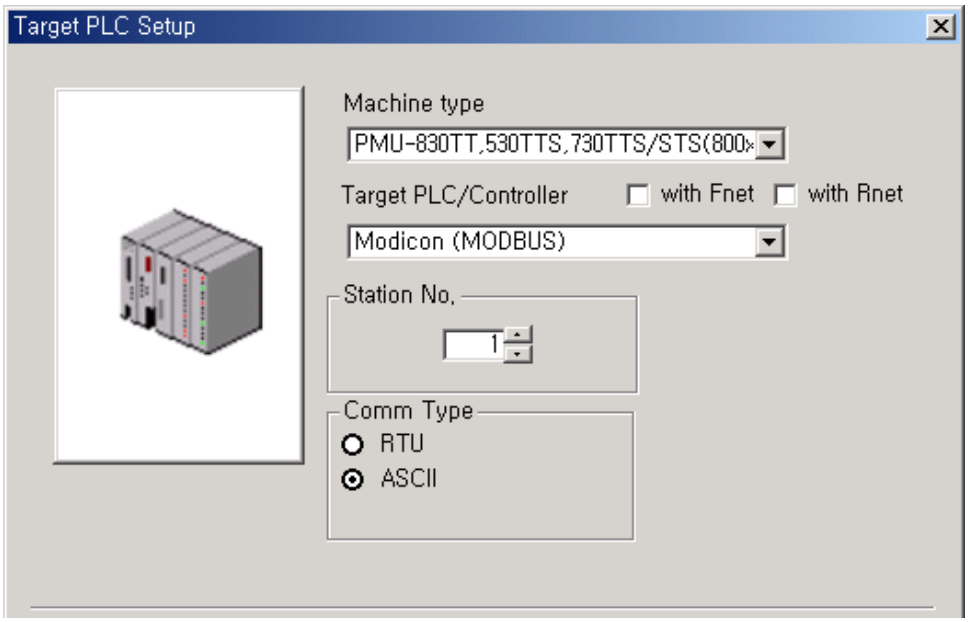
PLC Settings	
Baud Rate	2400 bps
Data Length	7 bit
Stop Bit	1 bit
Parity Bit	EVEN
Error Detection	LRC

Station Address is set by rotary switch of CPU Unit. It must be same to PMU's Station Num.

2.8.1.4 PMU Setup

(1)PMU Editor Setup

Select “Modicon(Modbus)” of “Modicon Series” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : Same as controller’s setting.
- Serial Data Bit : Same as controller’s setting.
- Serial Stop Bit : Same as controller’s setting.
- Serial Parity Bit : Same as controller’s setting.
- Serial Signal Level : Same as controller’s setting.
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s setting

2.8.2 Available Address List

Device	Address
Input Bit	**1**0001 ~ **1**8192
Output Bit	**0**0001 ~ **0**8192
Input Register(Word)	**3**0001 ~ **3**9999
Output Register(Word)	**4**0001 ~ **4**9999

Data “Write” is not available in case of Input Bit and Input Register.

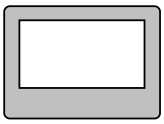
2.9 Samsung SPC Series

2.9.1 SPC Series PLC CPU Direct

The following section describes the system configuration and interface between Samsung SPC PLC and PMU using RS-232C through CPU direct port.

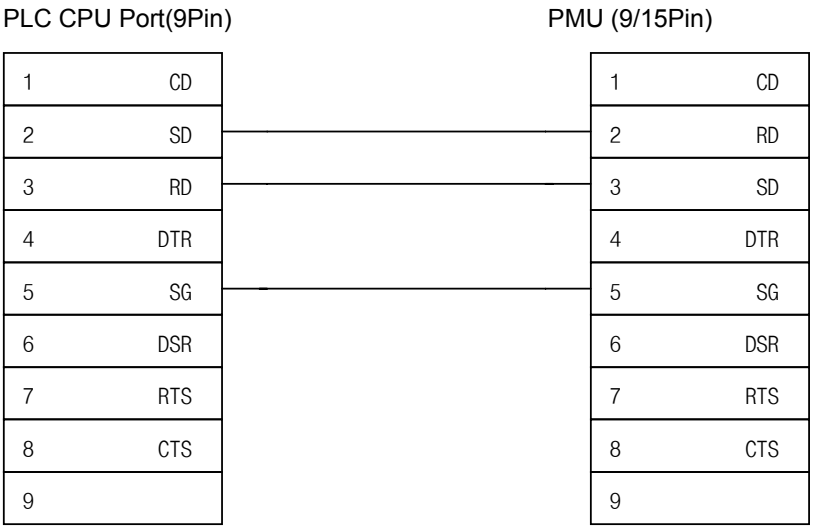
2.9.1.1 System Configuration

The above figure shows system configuration to connect SPC PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
SPC-10 SPC-24S SPC-100 SPC-120S SPC-300	None	Refer Cable Connection. (RS-232C)	All PMU

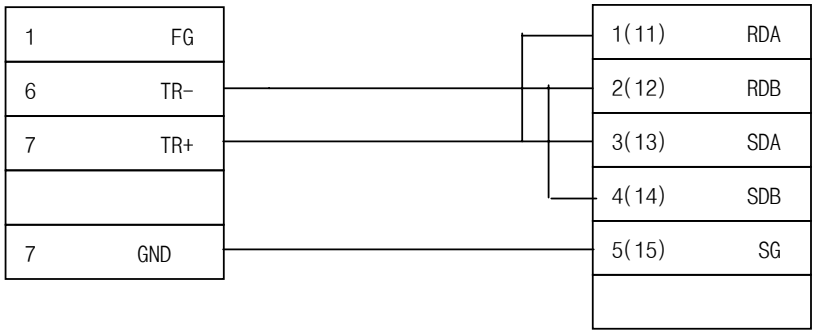
2.9.1.2 Cable Diagram

(1) RS-232C (SPC ↔ PMU (for 9/15Pin Connector)



(2) RS-485 (SPC ↔PMU (for 5Pin Terminal Block or 15Pin Connector))

PLC CPU Port(9Pin) PMU (5Pin Terminal Block/15Pin)



2.9.1.3 SPC PLC Setup

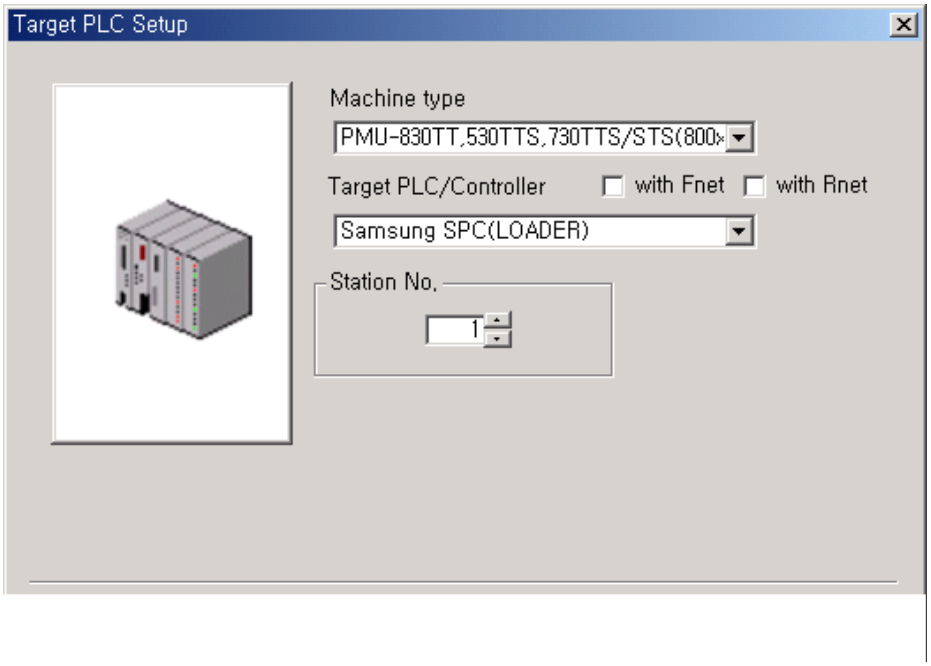
PLC Setting	
Baud Rate	9600 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	NONE
Error Detection	CRC

Station address is set by Rotary Switch of CPU Unit.

2.9.1.4 PMU Setup

(1) PMU Editor Setup

Select “Samsung SPC(Loader)”in PLC Type.



(2) PMU Serial Setup

Special settings are not needed. Automatic settings are as follows.

- Serial Baud Rate : 9600bps
- Serial Data Bit : 8bit
- Serial Stop Bit : 1bit
- Serial Parity Bit : None
- Serial Signal Level : RS-232C
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address

2.9.2 Available Address List

Device	Address
External Input/Output	R0000 ~ R0127
LINK Relay	L0000 ~ L0063
AUX. Relay	M0000 ~ M0127
KEEP Relay	K0000 ~ K0127
Special Relay	F0000 ~ F0015
Link Data	W0000 ~ W2047
T/C SV	SV000 ~ SV255
T/C CV	PV000 ~ PV255

SV : Set Value, CV : Current Vale

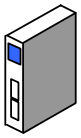
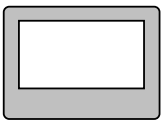
2.10 Siemens S5/S7 Series

2.10.1 S5/ S7 Serial Interface

The following section describes the system configuration and interface between Siemens S5/S7 series PLC and PMU using serial communication through link unit.

2.10.1.1 System Configuration

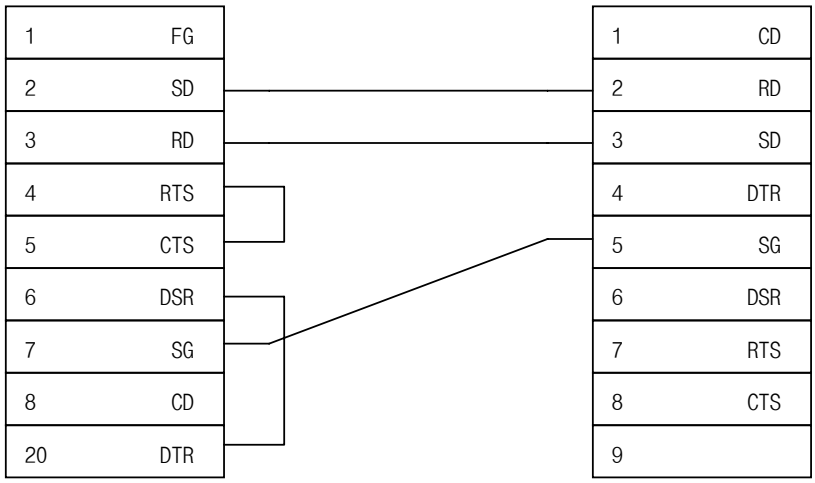
The above figure shows system configuration to connect S5/S7 PLC to PMU. (Use 3964R protocol)

PLC	Comm. Unit	Cable	PMU
			
S5 90U S5 95U S5 100U S5 115U S5 135U S5 155U S7-300 S7-400	CP525 CP340 CP441-2	Refer Cable Connection. (RS-232 / RS-422)	All PMU

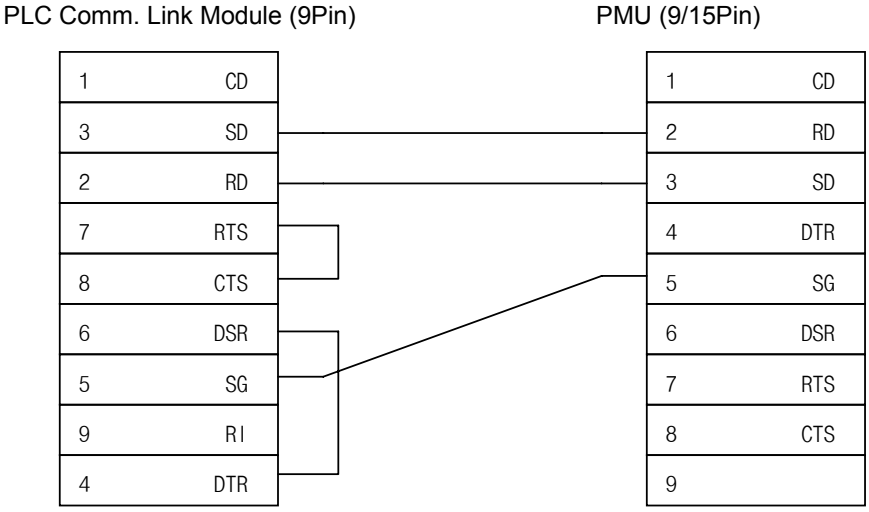
2.10.1.2 Cable Diagram

(1) RS-232C (CP525 ↔ PMU (for 9/15 Pin Connector))

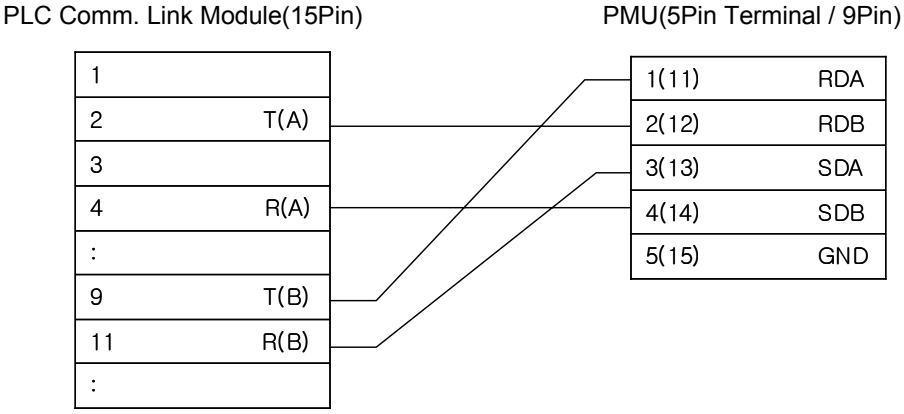
PLC Comm. Link Module(25Pin) PMU (9/15Pin)



(2) RS-232C (CP340, CP441-2 ↔ PMU (for 9/15 Pin Connector))



(3) RS-422 (CP340, CP441-2 ↔ PMU (for 5Pin terminal / 15Pin Connector)



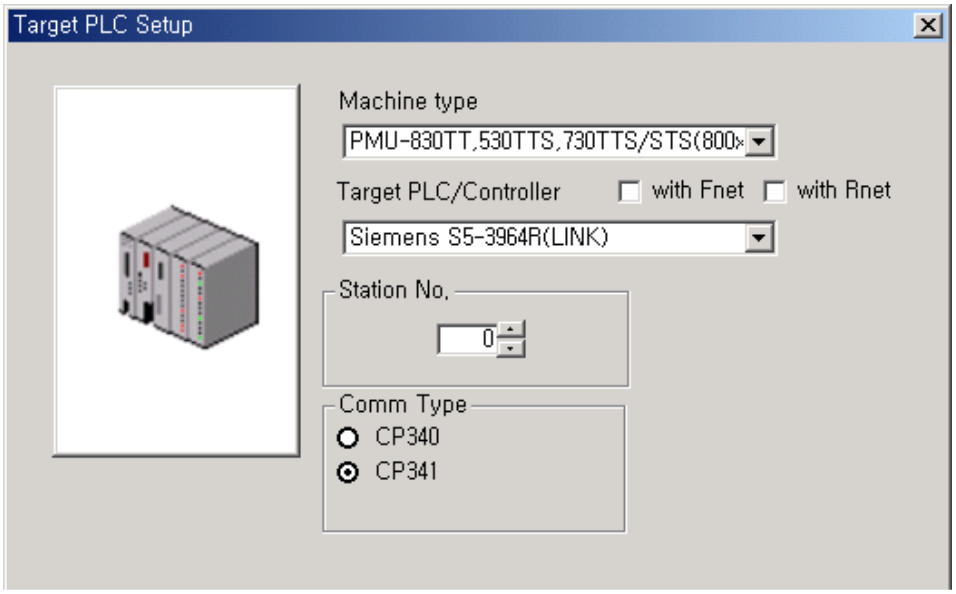
2.10.1.3 CP525/CP340/ CP441-2 Setup

PLC Setting	
Baud Rate	110 bps ~ 19200 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	EVEN
Error Detection	BCC(SUM)

2.10.1.4 PMU Setup

(1) PMU Editor Setup

Select “Siemens S5-3964R(Link)” in PLC Type.



(2) PMU Serial Setup

Recommended settings are as follows.

- Serial Baud Rate : 19200 bps
- Serial Data Bit : 8bit
- Serial Stop Bit: 1bit
- Serial Parity Bit : EVEN
- Serial Signal Level : RS-232C
- Controller’s Station No. at Comm. Diagnosis(0~31) : Setting is no meaning.

2.10.1.5 Available Address List

Device	Word Address
Data Register *1	D002:000 ~ D255:255
Expansive Data Register *1	X002:000 ~ X255:255

*1 : Data Register and Expansive Data Register are as follows.

D002:000

Data Word(DW) : 000~255

Data Block(DB) : 000~255

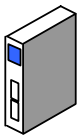
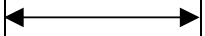
Expansive Data Register is available in only S5 135U/155U.

2.10.2 S7-300/400 (CPU Direct Using MPI Port)

The following section describes the system configuration and interface between Siemens S7-300/400 series PLC and PMU using serial communication through PC adapter.

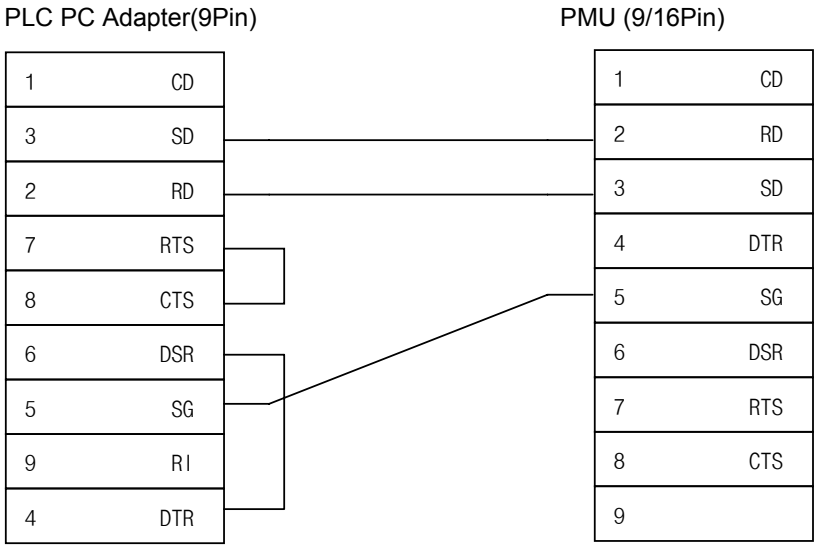
2.10.2.1 System Configuration

This figure shows system configuration to connect S7 PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
CPU312IFM CPU313 CPU314 CPU315 CPU315-2DP	PC Adapter	Refer Cable Connection (RS-232C)	All PMU

2.10.2.2 Cable Diagram

(1) RS-232C (PC Adapter ↔ PMU(for 9/15Pin Connector)



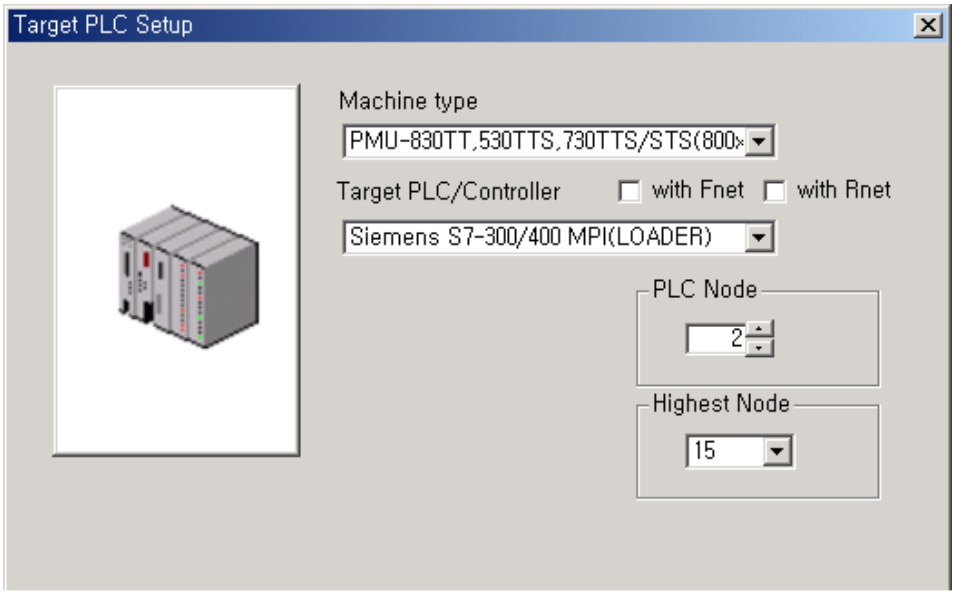
2.10.2.3 S7-300/400 CPU Setup

PLC Setting	
Baud Rate	19200 ~ 38400 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	ODD
Error Detection	BCC(SUM)

2.10.2.4 PMU Setup

(1) PMU Editor Setup

Select "S7-300/400 MPI(LOADER)" of "Siemens Series" in PLC type.



(2) PMU Serial Setup

Recommended settings are as follows.

- Serial Baud Rate : 19200 bps
- Serial Data Bit : 8bit
- Serial Stop Bit: 1bit
- Serial Parity Bit : ODD
- Serial Signal Level : RS-232
- Controller's Station No. at Comm. Diagnosis(0~31) : 1

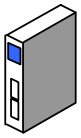
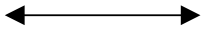
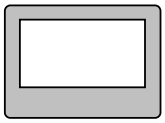
PLC node and Controller's station No must be set differently each other.
Highest node should not exceed PLC node. For example, If PLC node is set 16 by user, highest node should be set 31 or above.

2.10.3 S7-200 (CPU Direct Using PPI Port)

The following section describes the system configuration and interface between Siemens S7-200 and PMU using serial communication.

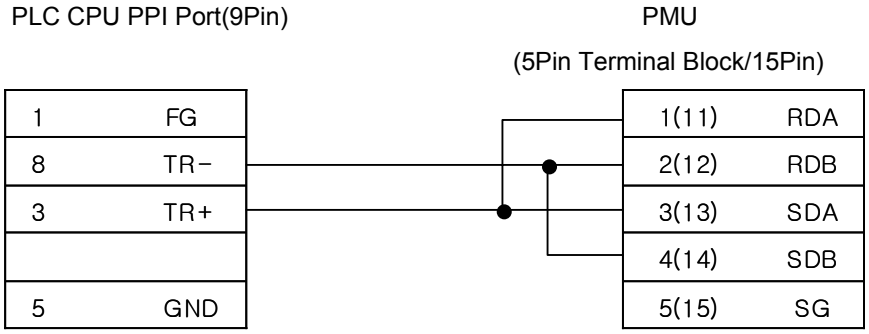
2.10.3.1 System Configuration

This figure shows system configuration to connect S7 PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
S7-200 (CPU212/214 / 222/224/226)	None	Refer to Cable Connection (RS-485)	All PMU

2.10.3.2 Cable Diagram

(1) RS-422 (S7-200 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))



2.10.3.3 S7-200CPU Setup

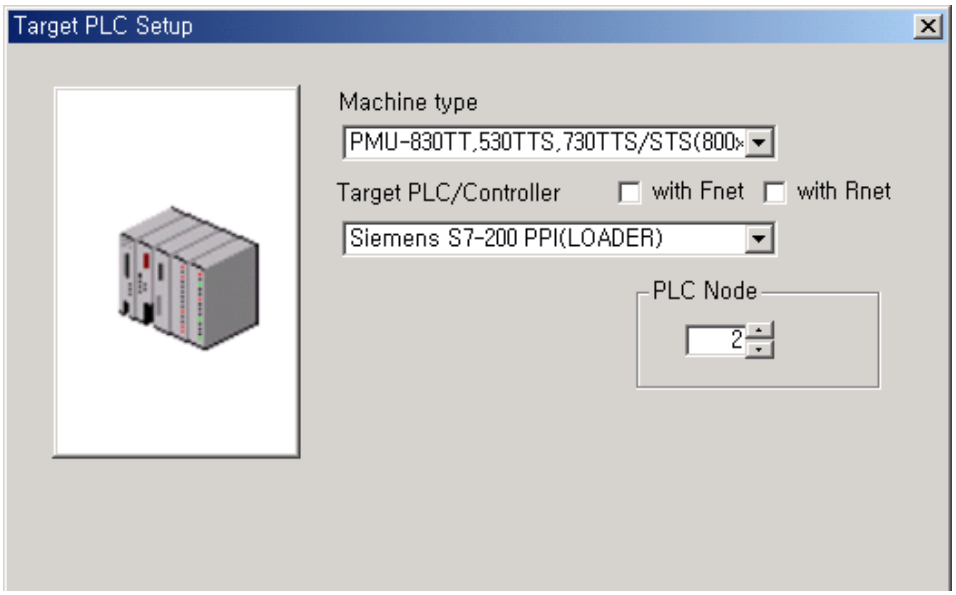
PLC Setting	
Baud Rate	9600 bps
Data Length	8 bit
Stop Bit	1 bit
Parity	EVEN
Error Detection	BCC(SUM)

Setting of Station Num. is default(2).

2.10.3.4 PMU Setup

(1) PMU Editor Setup

Select “Siemens S7-200 PPI(Loader)”in PLC type.



(2) PMU Serial Setup

Recommended settings are as follows.

- Serial Baud Rate : 9600bps
- Serial Data Bit : 8bit
- Serial Stop Bit: 1bit
- Serial Parity Bit : EVEN
- Serial Signal Level : RS-485
- Controller’s Station No. at Comm. Diagnosis(0~31) : 1

2.10.3.5 Available Address List

(1) S7-300 CPU Direct(Using MPI Port)

Device	Bit Address	Word Address
Input Relay	E0000 ~ E1277	EW00O ~ EW126
Output Relay	A0000 ~ A1277	AW000 ~ AW126
Timer		T000 ~ T127
Counter		Z00 ~ Z63
Data Block	DB01000000 ~ DB60655357	DB0100000 ~ DB6065534
Memory	M0000 ~ M2557	MW000 ~MW254

(2) S7-200

Device	Bit Address	Word Address
Input Relay	I00 ~ I77	IWO ~ IW6
Output Relay	Q00 ~ Q77	QW0 ~ QW6
Timer	T000 ~ T127	TW000 ~ TW127
Counter	C00 ~ C63	CW000 ~ CW127
Variable Memory	V000 ~ V4095	VW0000 ~ VW4094
Memory	M000 ~ M317	MW00 ~MW30
Special Memory	SM000 ~ SM857	SMWO ~ SMW84
Analog Input		AIWO ~ AIW30
Analog Output		AQWO ~ AQW30
High Speed Counting		HCO ~ HC2

*1:Data Register and Expansive Data Register are described as follows.

DB02 00000

Data Word(DW) : 000~65534

Data Block(DB) : 01~60

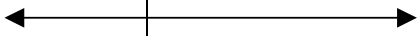
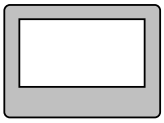
2.11 GE Fanuc 90-30/90-70 Series

2.11.1 GE Fanuc 90-30(SNP/SNP-X) PLC CPU Direct

The following section describes the system configuration and interface between GE Fanuc 90-30 PLC and PMU using RS-422 communication through CPU Loader Port.

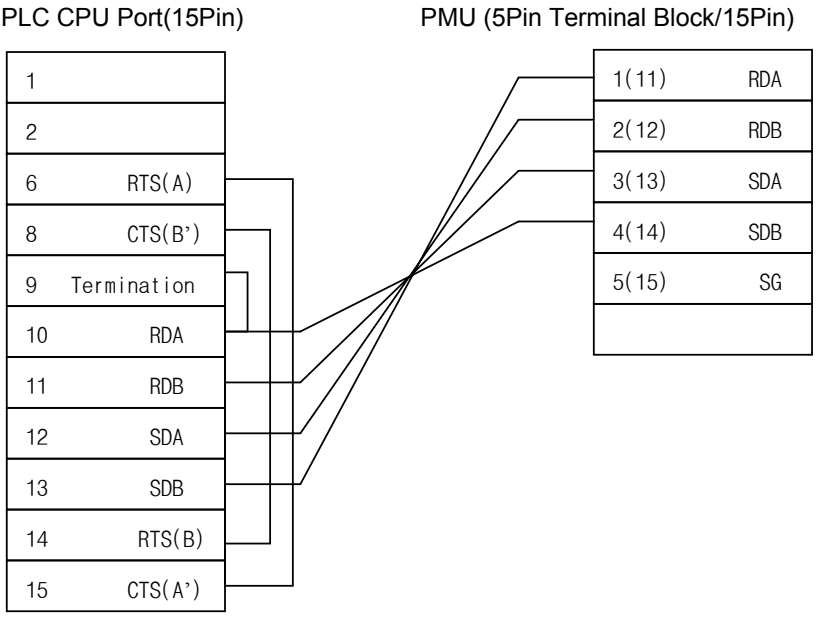
2.11.1.1 System Configuration

This figure shows system configuration to connect GE Fanuc 90-30 PLC to PMU.

PLC	Comm. Unit	Cable	PMU
			
Fanuc 90-30 (CPU311/CPU331)	None	Refer to Cable Connection (RS-422)	All PMU

2.11.1.2 Cable Diagram

(1) RS-422 (GE Fanuc 90-30 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))



Pin No. 6-15, 8-14, 9-10 has to be commonly connected.

2.11.1.3 GE Fanuc 90-30[SNP/SNP-X] PLC Setup

(1) Serial Parameter Setup

Recommended settings are 19200 bps, Data 8 bit, Stop 1 bit, Parity ODD.

PLC Settings	
Baud Rate	19200 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	ODD
Station Address	0

(2) Set Control ID – CPU ID (When using SNP protocol)

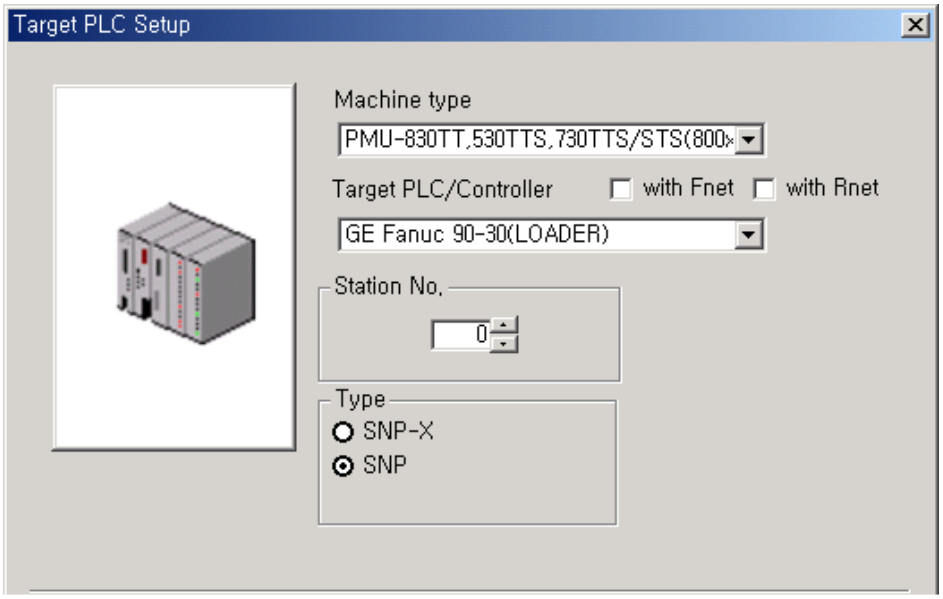
When using SNP protocol, a PLC CPU controller ID for a given PLC CPU has to be specified. Maximum of six ASCII characters can be permitted for GE FANUC 90-30 series. In order to recognize CPU ID from PMU by GE FANUC 90-30, CPU ID has to be set as the following rules.

- CPU ID setup for PLC : '0' ~ '99' DECIMAL CHARACTER

2.11.1.4 PMU Setup

(1) PMU Editor Setup

Select "GE Fanuc 90-30(LOADER)" in PLC Type.



(2) Selecting Protocol

Select ‘SNP’ or ‘SNP-X’ protocol according to protocol to be available.

(3) CPU ID Setup (When using SNP protocol)

If having selected SNP protocol in Target PLC setup window of PMU Editor, CPU ID of PMU Editor has to be set as same as CPU ID of PLC. Because PMU Editor uses station number as PLC CPU ID, PLC CPU ID has to be entered in ‘Station Number’ column of PMU Editor.

(4) PMU Serial Setup

Serial Settings are as follows.

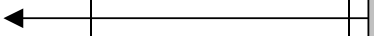
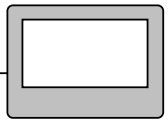
- Serial Baud Rate : 19200
- Serial Data Bit : 8
- Serial Stop Bit : 1
- Serial Parity Bit : ODD
- Serial Signal Level : RS-422
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address (Same as CPU ID for SNP protocol)

2.11.2 GE Fanuc 90-70(SNP-X) PLC Serial Interface

The following section describes the system configuration and interface between GE Fanuc 90-70 PLC and PMU using RS-422 communication through IC697CMM711 Unit.

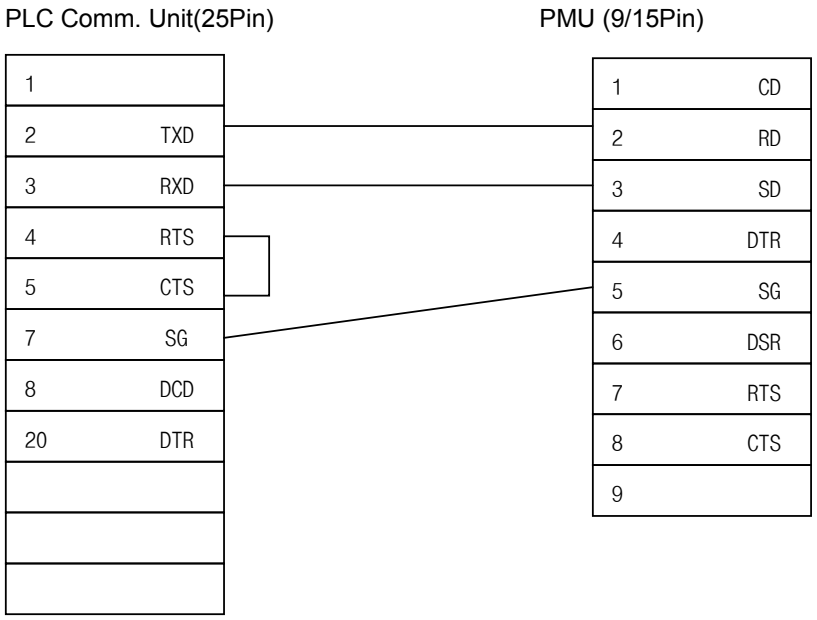
2.11.2.1 System Configuration

This figure shows system configuration to connect GE Fanuc 90-70 PLC to PMU.

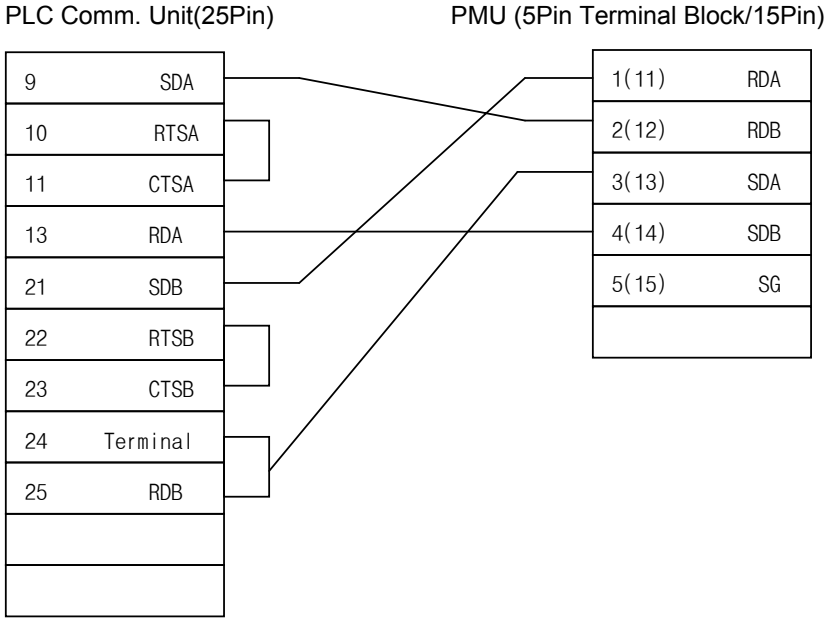
PLC	Comm. Unit	Cable	PMU
			
GE FANUC 90-70 (CPU 731/732/771/772/781/782)	IC697CMM711	Refer to Cable Connection.	All PMU

2.11.2.2 Cable Diagram

(1) RS-232C (GE Fanuc 90-70 ↔ PMU (for 9/15Pin Connector))



(2) RS-422 (GE Fanuc 90-70 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))



2.11.2.3 GE Fanuc 90-70[SNP-X] PLC Setup

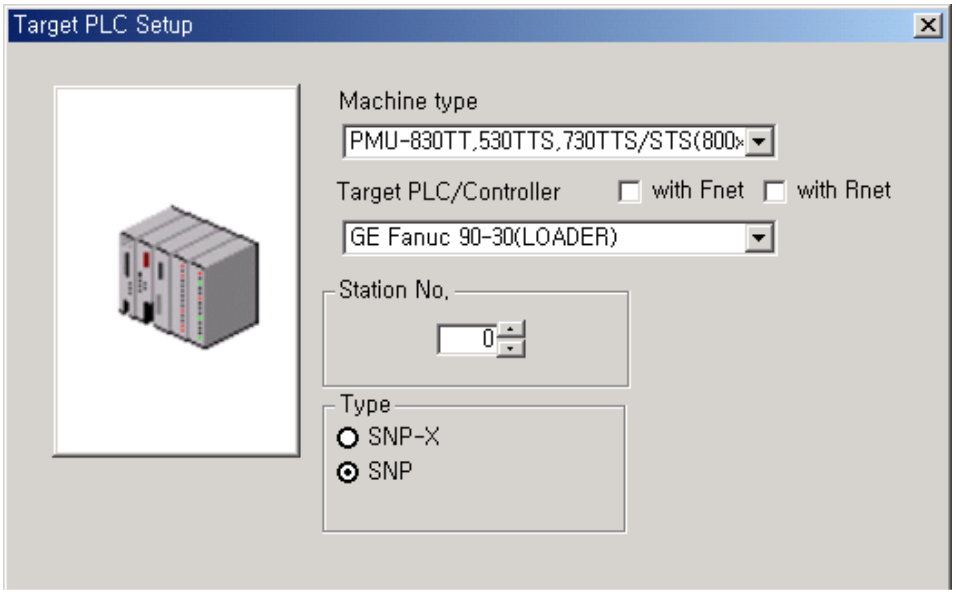
Recommended settings are 19200 bps, Data 8 bit, Stop Bit 1 bit, Parity ODD.

PLC Setting	
Baud Rate	19200 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	ODD
Station Address	0

2.11.2.4 PMU Setup

(1) PMU Editor Setup

Select “GE Fanuc 90-70[SNP-X](LOADER)” in PLC type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : 19200
- Serial Data Bit : 8
- Serial Stop Bit : 1
- Serial Parity Bit : ODD
- Serial Signal Level : RS-422
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address

2.11.3 Available Address List

(1) GE Fanuc 90-30/90-70[SNP-X]

Device	Bit Address	Word Address
Input Relay(I)	I0001 ~ I12288	I00001 ~ I12273
Output Relay(Q)	Q00001~ Q12288	Q0001 ~ Q12273
Internal Relay(M)	M00001 ~ M12288	M0001 ~ M12273
Global Relay(G)	G0001 ~ G7680	G0001 ~ G7665
Momentary Relay(T)	T001 ~ T256	T001 ~ T241
System Function Relay(SA)	SA001 ~ SA128	SA001 ~ SA113
System Function Relay(SB)	SB001 ~ SB128	SB001 ~ SB113
System Function Relay(SC)	SC001 ~ SC128	SC001 ~ SC113
System Function Relay(S)	S001 ~ S128	S001 ~ S113
Register(R)		R00001 ~ R16384
Analog Input(AI)		AI0001 ~ AI8192
Analog Output(AQ)		AQ0001 ~ AQ8192

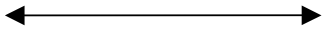
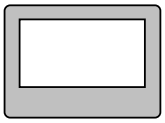
2.12 Compile Technology Tiny PLC Series

2.12.1 Tiny PLC CPU Direct

The following section describes the system configuration and interface between Compile Technology Tiny PLC and PMU using serial communication.

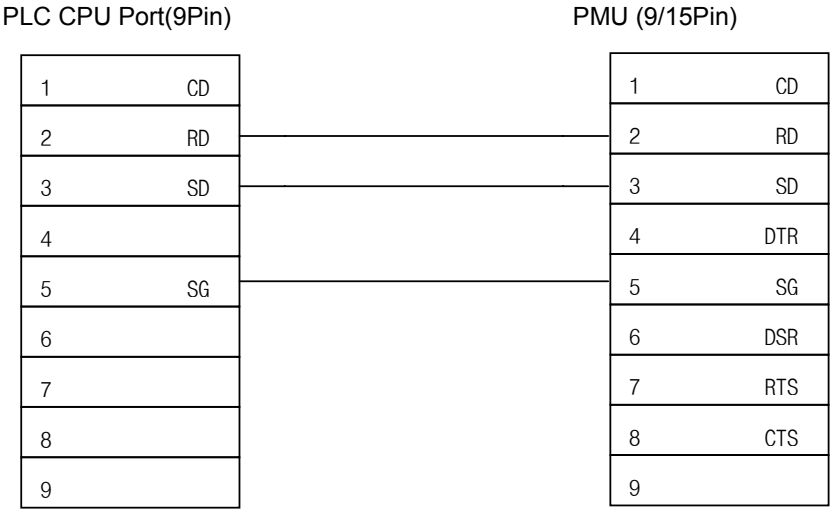
2.12.1.1 System Configuration

This figure shows system configuration to connect Tiny PLC to PMU.

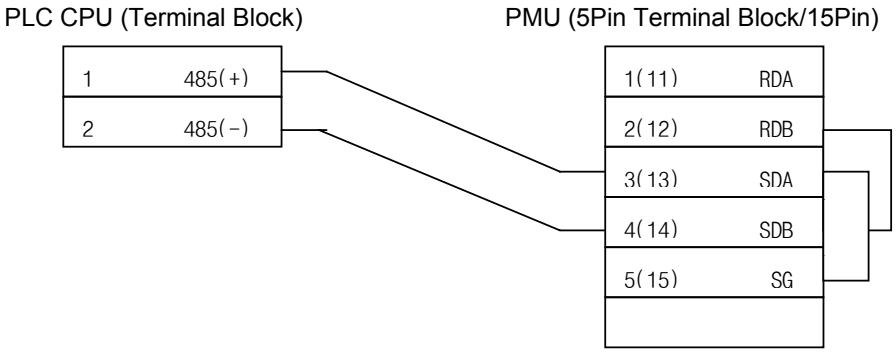
PLC	Comm. Unit	Cable	PMU
			
TCP32/37	None	Refer to Cable Connection. (RS-232C/485)	All PMU

2.12.1.2 < Cable Diagram >

(1) RS-232C (TCP32/37↔PMU (for 9/15Pin Connector))



(2) RS-485 (TCP32/37 ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))



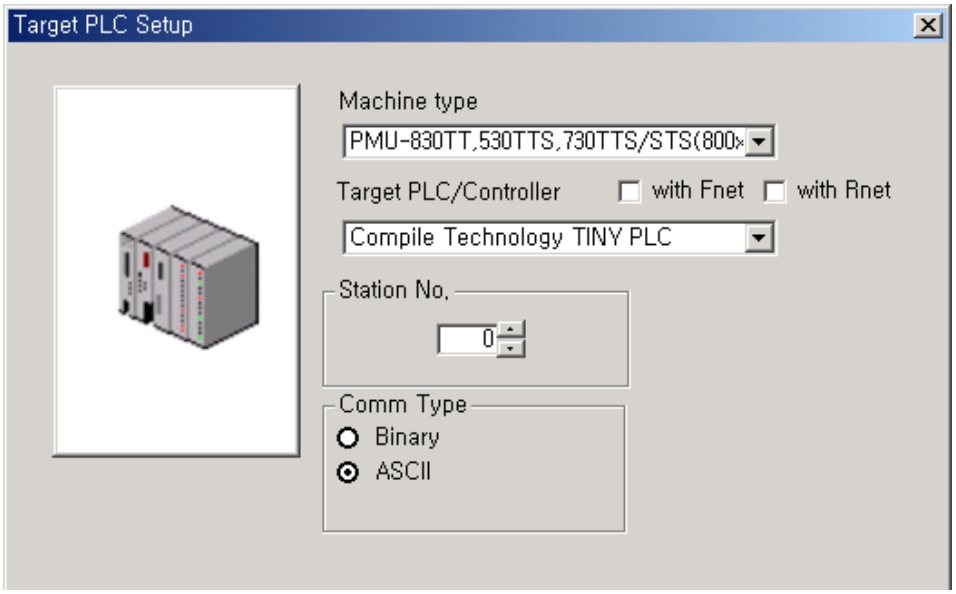
2.12.1.3 Tiny PLC Setup

Do not need set.

2.12.1.4 PMU Setup

(1) PMU Editor Setup

Select “Compile Technology TINY PLC” in PLC type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : 9600
- Serial Data Bit : 8(fixed)
- Serial Stop Bit : 1(fixed)
- Serial Parity Bit : None(fixed)
- Serial Signal Level : Same as controller’s Station Address
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address

2.12.2 Available Address List

PLC Address to be available to READ/WRITE in PMU is as follows.

In case of TCP32/37

Device	Bit Address	Word Address
Input/Output Relay (P)	P0000 – P0157	P0000 - P014
AUX. Relay (M)	M0000 – M1277	M0000 – M126
KEEP Relay (K)	K0000 - K0317	K0000 - K030
Special Relay (F)	F0000 - F0157	F0000 - F014
Step Relay (S)	S0000 ~ S0317	S0000 - S030
Timer-CV (T)		T0000 - T0255
Counter-CV (C)		C0000 - C0255
Data Register (D)		D0000 – D1023
AD Area (AD)		A0000 - A0015
High Speed Counter Area (CNT)		N0000 – N0001
LCD Area (CH)		H0000 - H0079
7 Segment (G)		G0000 – G0039

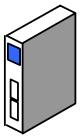
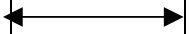
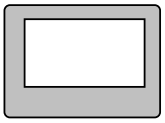
2.13 Toshiba Prosec-T Series

2.13.1 Toshiba Prosec-T Series Serial Interface

The following section describes the system configuration and interface between Toshiba Prosec-T PLC and PMU using serial communication through CPU LINK.

2.13.1.1 System Configuration

This figure shows system configuration to connect Toshiba Prosec-T PLC to PMU.

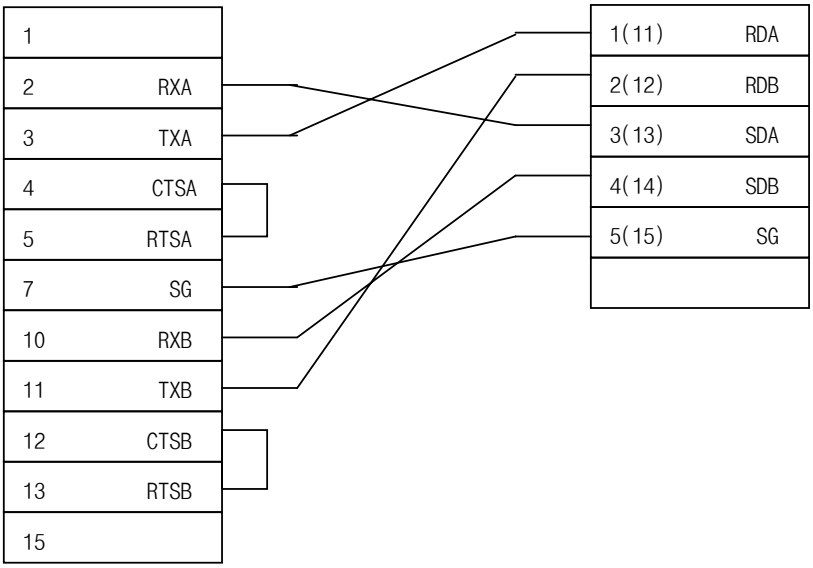
PLC	Comm. Unit	Cable	PMU
			
T3, T3H	CPU LINK	Refer Cable Connection	All PMU
T2E	CPU Port		
T2N	CPU LINK		
T2E	CM231E		

2.13.1.2 Cable Connection

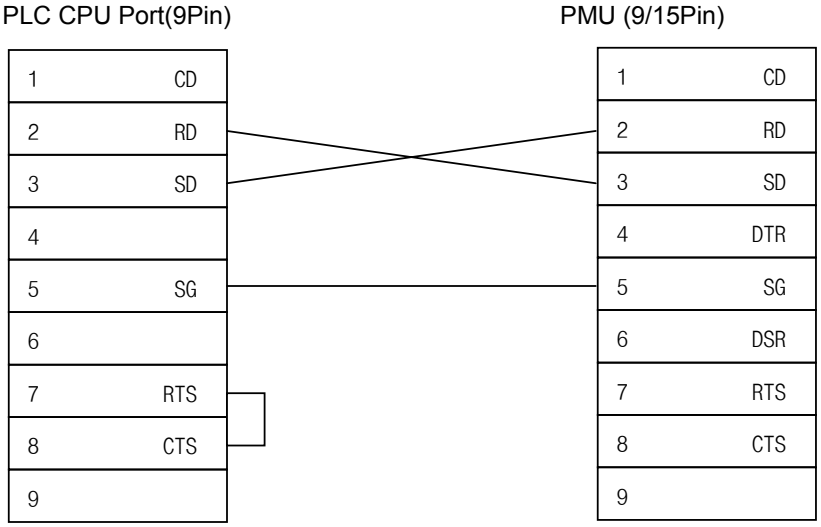
(1) RS-422 (T3/T3H/T2N ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))

PLC CPU Link(15Pin) PMU

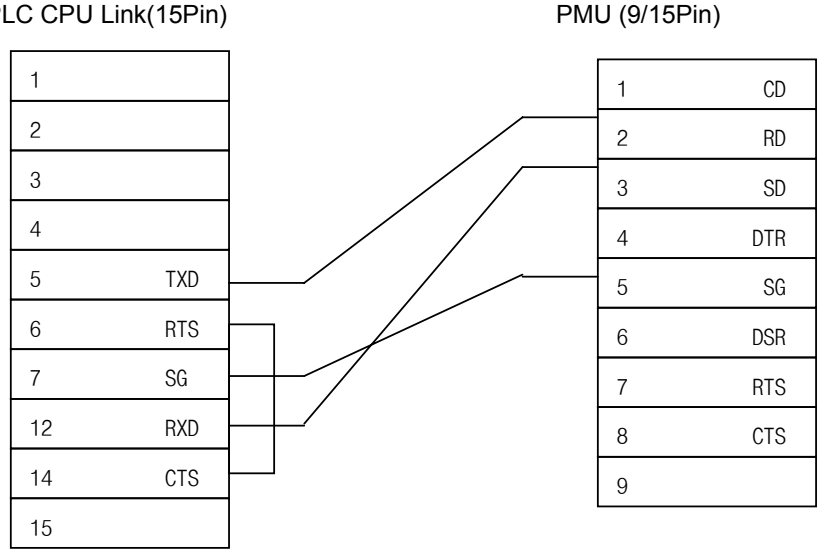
(5Pin Terminal Block/15Pin)



(2) RS-232C(T2E ↔ PMU (for 9/15Pin Connector))



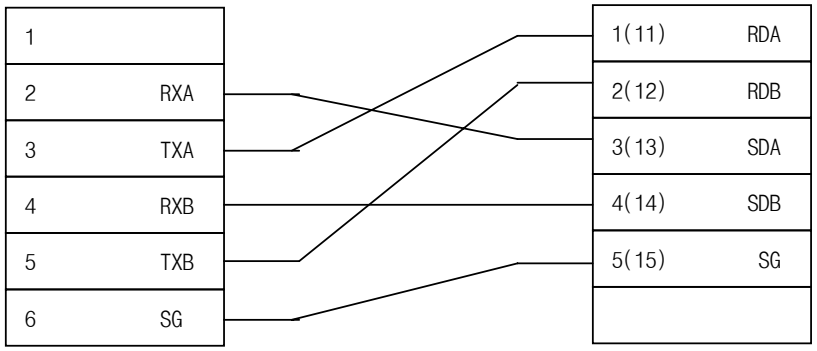
(3) RS-232C (T2N ↔ PMU(for 9/15Pin Connector))



(4)RS-422 (T2E ↔ PMU (for 5Pin Terminal Block or 15Pin Connector))

PLC CPU Port(Terminal Block) PMU

(5Pin Terminal Block/15Pin)



2.13.1.3 Toshiba Prosec-T PLC Setup

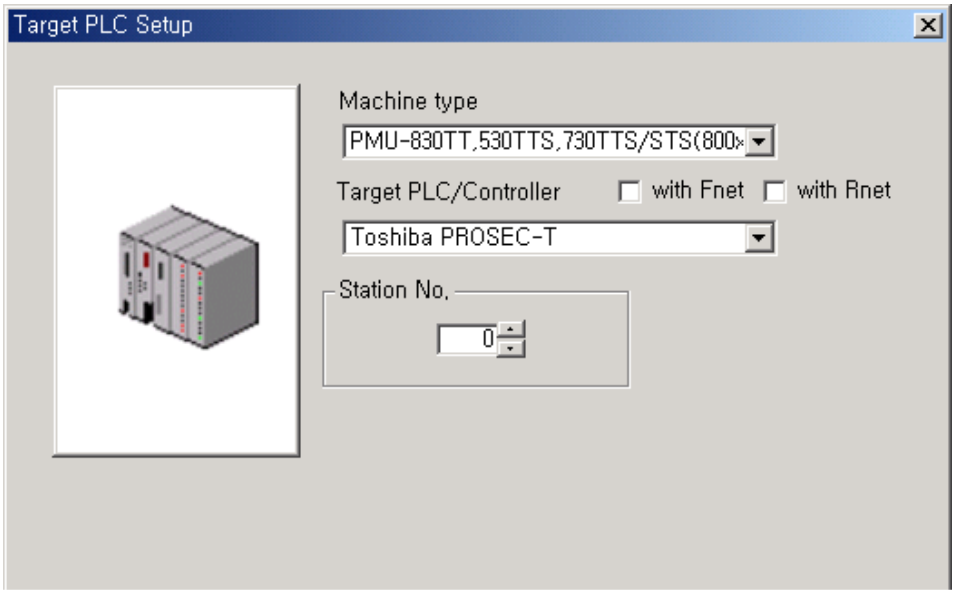
Recommended settings are 19200 bps, Data 8 bit, Stop Bit 2 , Parity ODD .

PLC Setting	
Baud Rate	19200 bps
Data Length	8 bit
Stop Bit	2 bit
Parity	ODD
Station Address	1

2.13.1.4 PMU Setup

(1) PMU Editor Setup

Select “Toshiba Prosec-T” in PLC type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : 19200
- Serial Data Bit : 8
- Serial Stop Bit : 2
- Serial Parity Bit : ODD
- Serial Signal Level : Same as controller’s Station Address
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address

2.13.2 Available Address List

(1) T3/T3H/T2N/T2E

Device	Bit Address	Word Address
External Input	X0000 ~ X511F	XW0000 ~ XW511
External Output	Y0000 ~ Y511F	YW0000 ~ YW511
Internal Relay	R0000 ~ R999F	RW000 ~ RW999
Special Relay	S0000 ~ S255F	SW000 ~ SW255
Link Register Relay	Z0000 ~ Z999F	
Link Relay	L0000 ~ L255F	
Timer(contact)	T000 ~ T999	
Counter(contact)	C000 ~ C511	
Timer(Current Value)		T000 ~ T999
Counter (Current Value)		C000 ~ C511
Data Register		D0000 ~ D8191
Link Register		W0000 ~ W2047
File Register		F0000 ~ F32767

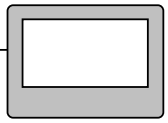
2.14 KOYO PLC Series

2.14.1 KOYO PLC CPU Direct

The following section describes the system configuration and interface between KOYO DL-205 and PMU using RS-232 communication through CPU Loader Port.

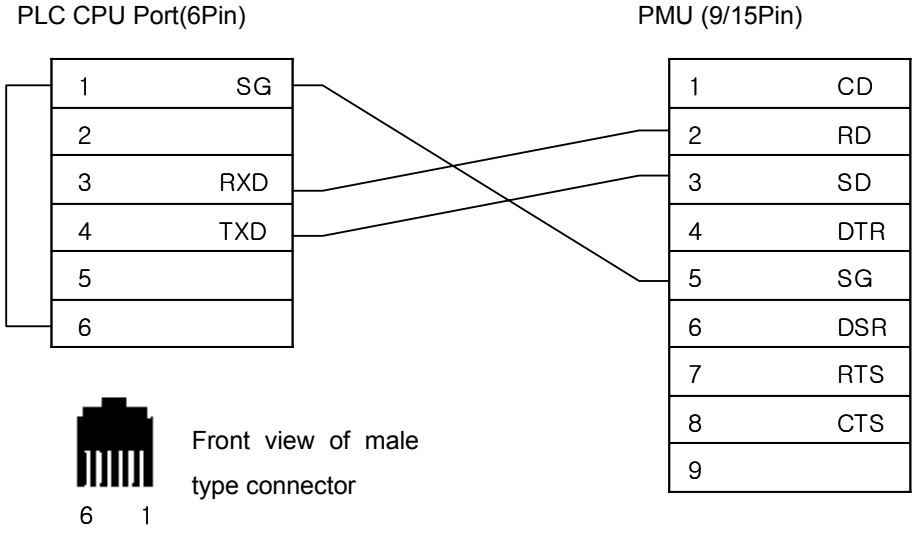
2.14.1.1 System Configuration

This figure shows system configuration to connect KOYO DL-205 to PMU.

PLC	Comm. Unit	Cable	PMU
			
DL-205 (D2-240)	None	Refer to Cable Connection.(RS-232)	All PMU

2.14.1.2 Cable Diagram

(1) RS-232 (DL-205 ↔ PMU (for 9/15Pin Connector))



In above cable diagram, PLC CPU port (6 Pin) of D2-240 is Port 2.

2.14.1.3 DL-205 PLC Setup

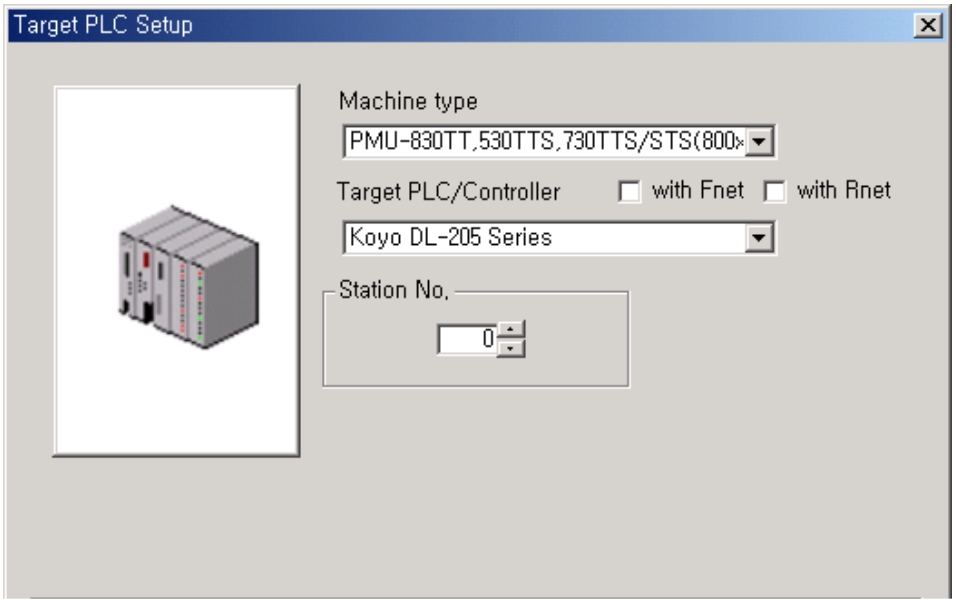
(1) Serial Parameter Setup

Special serial setup is not needed for DL-205 PLC.

2.14.1.4 PMU Setup

(1) PMU Editor Setup

Select “KOYO DL-205 Series” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : 19200
- Serial Data Bit : 8
- Serial Stop Bit : 1
- Serial Parity Bit : None
- Serial Signal Level : RS-232
- Controller’s Station No. at Comm. Diagnosis(0~31) : 2

2.14.2 Available Address List

① DL-205

Device	Bit Address	Word Address
Input Relay	X0000 ~ X0477	V40400 ~ V40423
Output Relay	Y0000 ~ Y0477	V40500 ~ V40523
Control Relay	C0000 ~ C0377	V40600 ~ V40617
Stage	-	V41000 ~ V41037
Timer(contact)	T000 ~ T177	V41100 ~ V41107
Counter(contact)	CT000 ~ CT177	V41140 ~ V41147
Timer(elapsed time)	-	V0000 ~ V0177
Counter(elapsed value)	-	V1000 ~ V1177
Variable Memory	-	V2000 ~ V3777

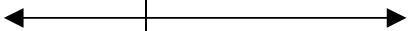
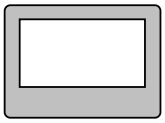
2.15 SAIA PCD Series

2.15.1 SAIA PCD CPU Direct

The following section describes the system configuration and interface between SAIA PCD Series and PMU using RS-232 communication through CPU Loader Port (PGU).

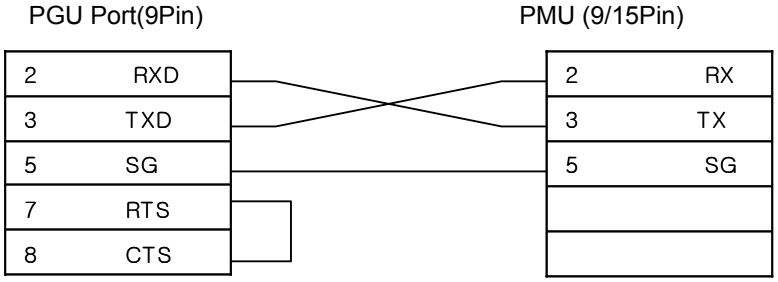
2.15.1.1 System Configuration

This figure shows system configuration to connect SAIA PCD Series to PMU.

PLC	Comm. Unit	Cable	PMU
			
SAIA PCD2 (PGU)	None	Refer to Cable Connection. (RS-232)	All PMU

2.15.1.2 Cable Diagram

(1) RS-232 (SAIA PCD2 PGU ↔ PMU (for 9/15Pin Connector))

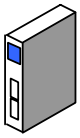
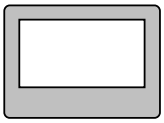


2.15.2 SAIA PCD Serial Interface

The following section describes the system configuration and interface between SAIA PCD Series and PMU using RS-232/485 communication through Serial interface.

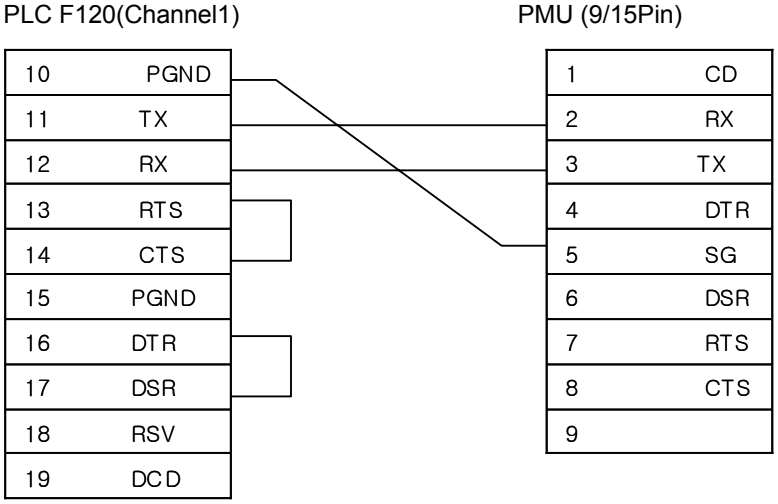
2.15.2.1 System Configuration

This figure shows system configuration to connect SAIA PCD Series to PMU.

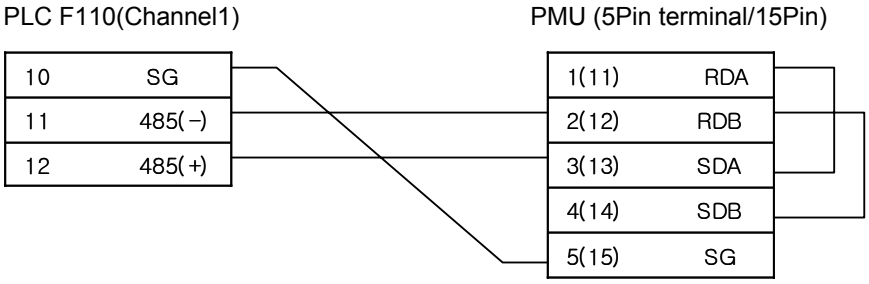
PLC	Comm. Unit	Cable	PMU
			
SAIA PCD2	PCD7 F120 (Option Unit)	Refer to Cable Connection. (RS-232)	All PMU
	PCD7 F110 (Option Unit)	Refer to Cable Connection. (RS-485)	

2.15.2.2 Cable Diagram

(1) RS-232 (PCD7 F120 ↔ PMU (for 9/15Pin Connector))



(2) RS-485 (PCD7 F110 ↔ PMU (for 5Pin Terminal or 15Pin Connector))



2.15.2.3 SAIA PCD PLC Setup

(1) Serial Parameter Setup

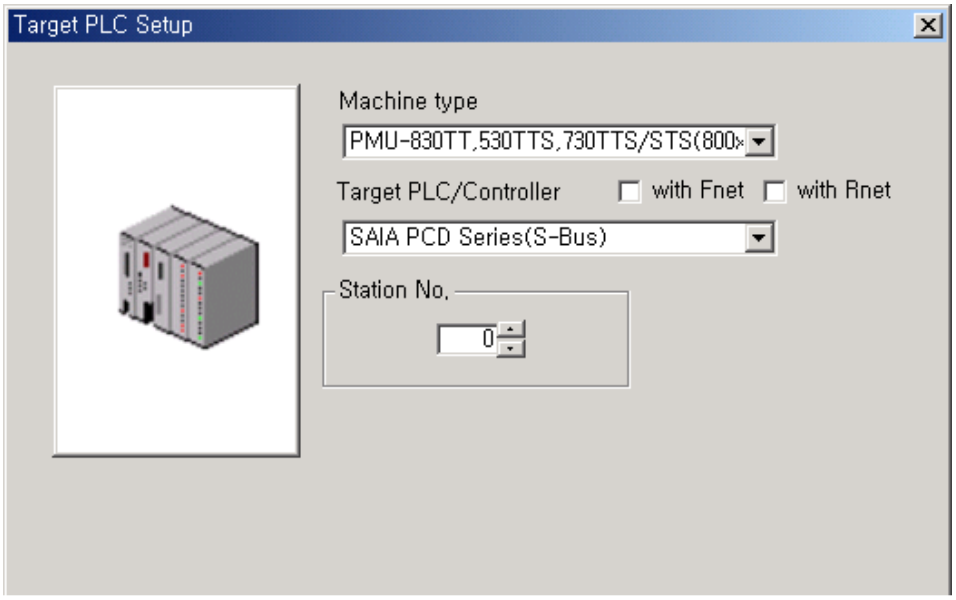
Serial parameter of SAIA PCD series can be setup using SAIA PG4 and recommended setting are as follows :

PLC Settings	
Baud Rate	100 ~ 38400 bps
Data Length	8 bit
Stop Bit	1 bit
Parity Bit	None
Station Address	0 ~ 255
Protocol	DATA Mode
Channel	CH0 (PGU Port)/CH1/CH2

2.15.2.4 PMU Setup

(1) PMU Editor Setup

Select “SAIA PCD Series (S-BUS)” in PLC Type.



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : same as PLC setting
- Serial Data Bit : same as PLC setting
- Serial Stop Bit : same as PLC setting
- Serial Parity Bit : same as PLC setting
- Serial Signal Level : same as PLC setting
- Controller’s Station No. at Comm. Diagnosis(0~31) : Same as controller’s Station Address

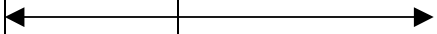
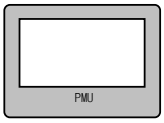
2.16 FATEK FACON Series

2.16.1 FATEK FACON Series interface

The following section describes the system configuration and interface between FATEK FACON and PMU by serial RS-232 or RS-485.

2.16.1.1 System Configuration

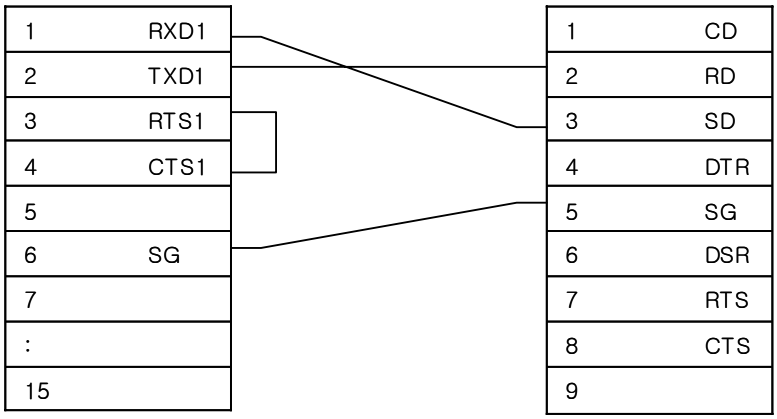
This figure shows system configuration to connect FATEK FACON to PMU.

<table>
<tr><th>Controller</th><th>Comm. Module</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td>  </td><td></td><td>  </td></tr>
<tr><td rowspan="2">FATEK FACON (MC TYPE)</td><td rowspan="2">None</td><td>Refer to Connection Diagram(RS-232)</td><td rowspan="2">All PMU</td></tr>
<tr><td>Refer to Connection Diagram (RS-485)</td></tr>
</table>

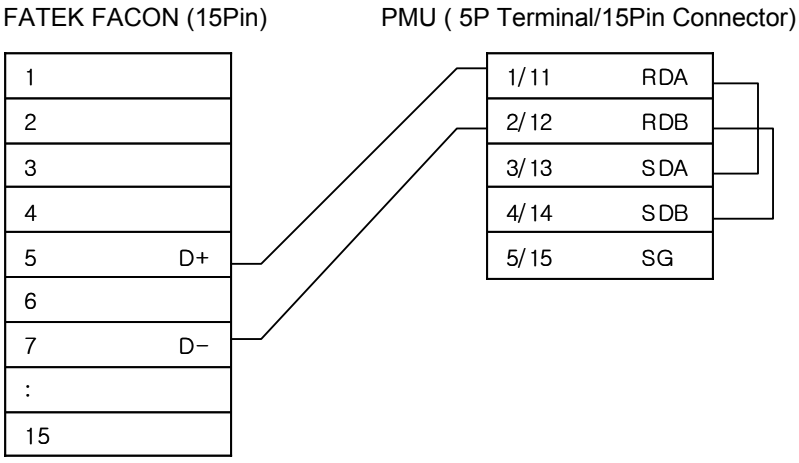
2.16.1.2 Cable Diagram

(1) RS-232 Connection Diagram (FATEK FACON ↔ PMU)

FATEK FACON (15Pin) PMU (9/15Pin Connector)



(2) RS-485 Connection Diagram (FATEK FACON ↔ PMU)



2.16.1.3 FATEK FACON Series Setup

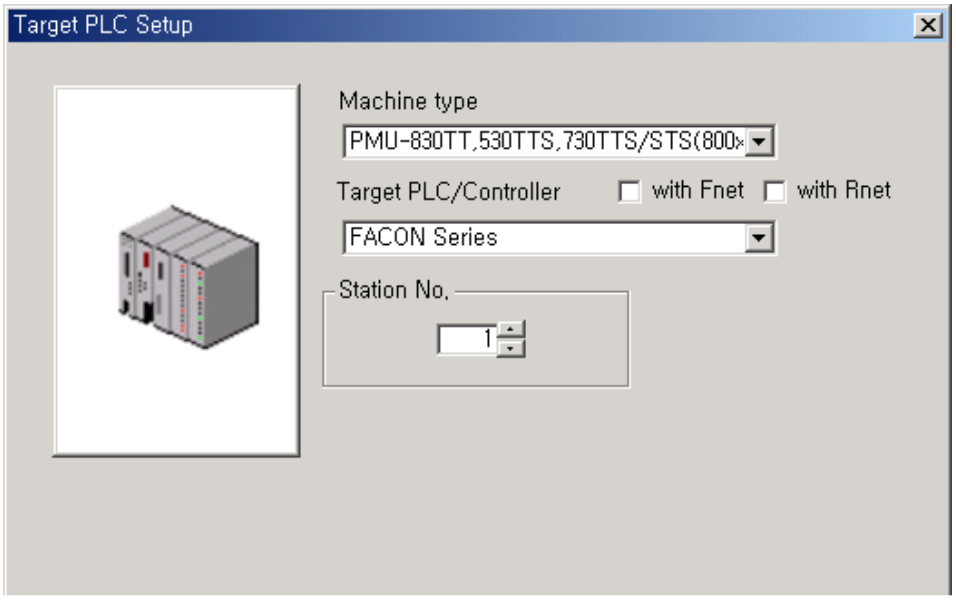
Recommended communication settings for PLC are as following table.

PLC Communication Setup	
Baud rate	9600 bps
Data Bit	7 bit
Stop Bit	1 bit
Parity Bit	EVEN
Unit No	1 ~ 255

2.16.1.4 PMU Setup

(1) PMU Editor Setup

Select Controller type of FACON Series as shown figure



(2) PMU Serial Setup

Serial Settings are as follows.

- Serial Baud Rate : same as PLC setting
- Serial Data Bit : same as PLC setting
- Serial Stop Bit : same as PLC setting
- Serial Parity Bit : same as PLC setting
- Serial Signal Level : same as PLC setting
- Controller's Station No. at Comm. Diagnosis(0~31) : Same as controller's Station Address

2.16.2 Available Address List

Element	Symbol	Name	Bit Address	Word Address
Discrete	X	Input discrete	X0000 ~ X9999	WX0000 ~ WX9984
	Y	Output relay	Y0000 ~ Y9999	WY0000 ~ WY9984
	M	Internal relay	M0000 ~ M9999	WM0000 ~ WM9984
	S	Step relay	S0000 ~ S9999	WS0000 ~ WS9984
	T	Timer discrete	T0000 ~ T9999	-
	C	Counter discrete	C0000 ~ C9999	-
Data Register	TMR	Timer register	-	RT0000 ~ RT9999
	CTR	Counter register	-	RC0000 ~ RC9999
	D	Data register	-	D00000 ~ R65535
	R	Data register	-	R00000 ~ D03839
	ROR	Read only register	-	R05000 ~ R08071
	IR	Analog input register	-	R03840 ~ R03903
	OR	Analog output register	-	R03904 ~ R03967
	SR	System register	-	R03968 ~ R04095 , R04136 ~ R04167
		High-speed timer register	-	R04152 ~ R04154
		Calendar register	-	R04129 ~ R04135

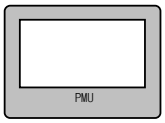
2.17 HITACHI MICRO EH Series

2.17.1 HITACHI MICRO EH Series Interface

This section describes the system configuration and interface between the HITACHI MICRO EH Series and PMU.

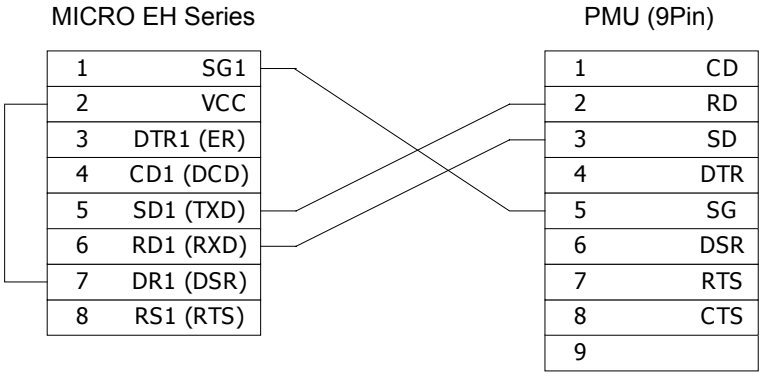
2.17.2 System Configuration

This figure shows system configuration to connect MICRO EH Series to PMU.

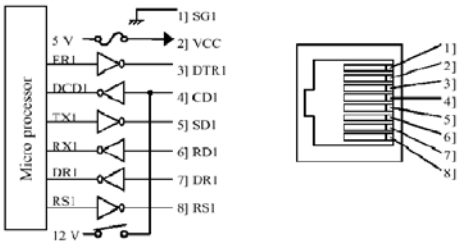
PLC	COMM. Module	Cable	PMU
			
MICRO EH Series	None	Refer to Connection Diagram	All PMU

2.17.2.1 Cable Connection Diagram

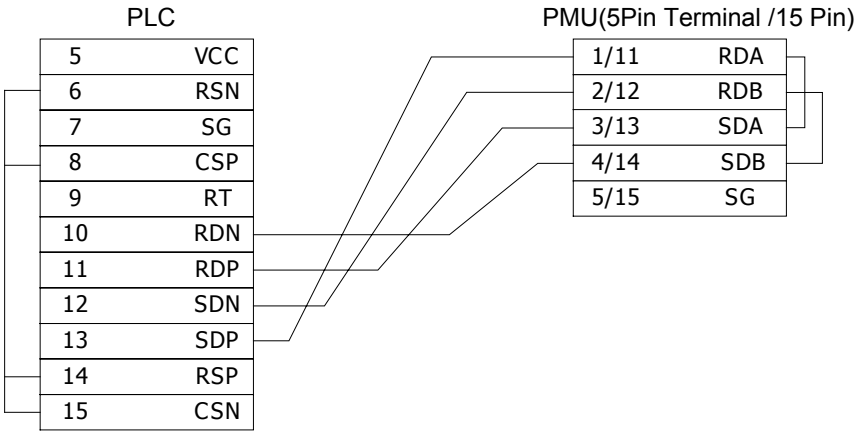
(1) RS-232 Cable Connection Diagram (MICRO EH Series ↔ PMU)



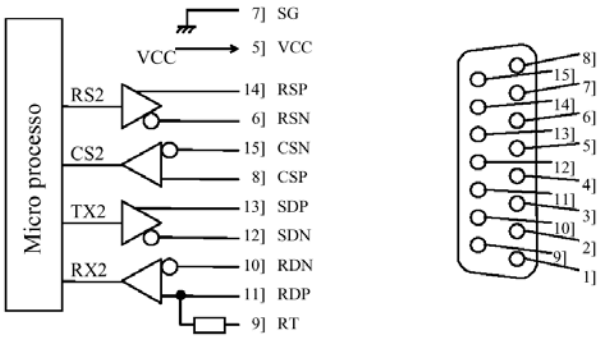
*** MICRO EH Series RS-232 Connector (the front side)**



(2) RS-422 Cable Connection Diagram (MICRO EH Series ↔ PMU Series)



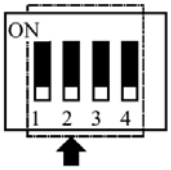
*** MICRO EH Series RS-422 Connector**



2.17.2.2 MICRO EH Series Setup

PLC Communication Setup	
Baud rate	9600/19200/38400 bps
Data Bit	7 bit (fixed)
Stop Bit	1 bit (fixed)
Parity Bit	EVEN (fixed)

Communication Parameter setup of the MICRO EH Series using DIP switch are as fallows.



No	1	2	3	4	Baud rate(bps)
DIP Switch	ON	OFF	ON	OFF	38400
	ON	OFF	OFF	OFF	19200
	OFF	OFF	ON	OFF	9600

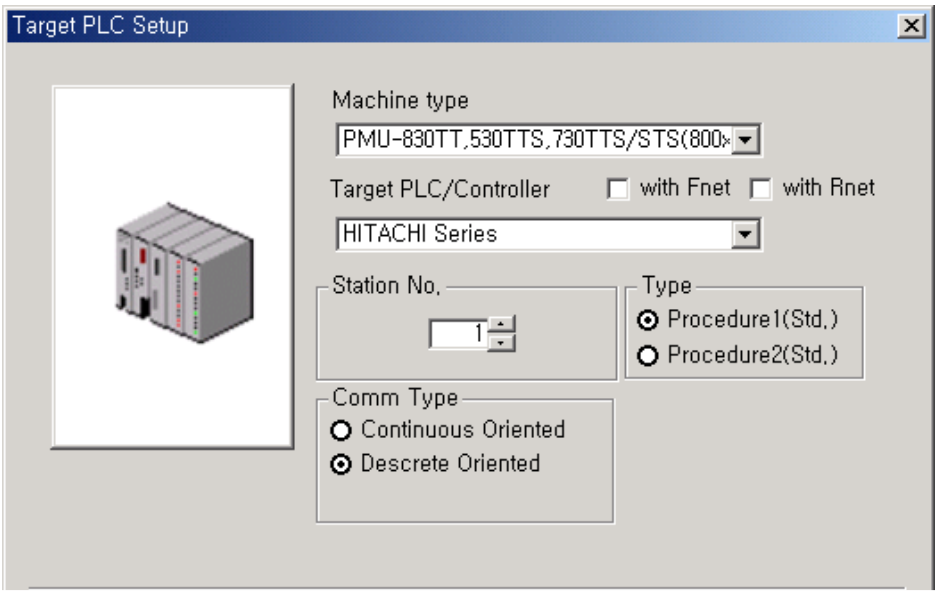
Note

10-Point Type of the MICRO EH Series has not DIP switch and Baud rate is fixed as 38400 bps.

2.17.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of “HITACH Series” as shown figure.



(2) Serial communication setup in PMU

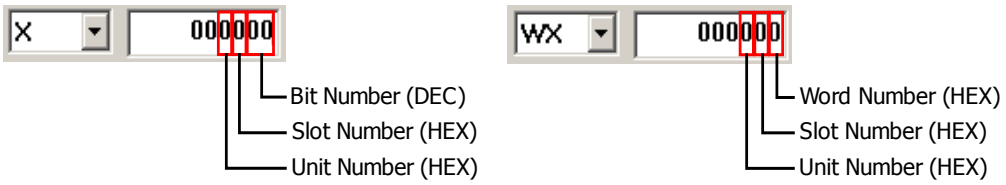
Communication setup as follows:

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : 7 (Fixed)
- Serial Stop Bit : 1 (Fixed)
- Serial Parity Bit : EVEN (Fixed)
- Serial Signal Level : RS-232 / RS-485
- Station No : None

2.17.2.4 Address Setup

Address setup of the HITACHI MICRO-EH Series is shown as below figure.

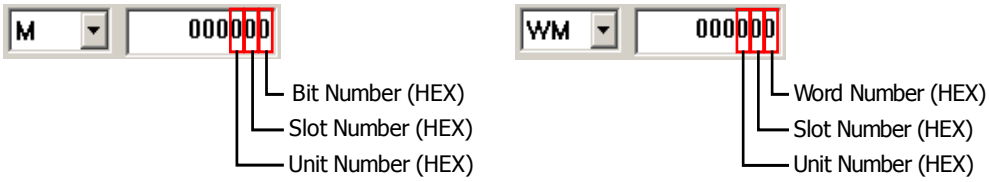
(1) Address setup External I/O



Note

In the address setup for X and Y device, the lower two digits are decimal and upper three digits are hexadecimal.

(2) Address setup Internal I/O



2.17.3 Available Address List

Symbol	Bit Address	Word Address
X	X0000 ~ X4007	WX000 ~ WX400
Y	Y0100 ~ Y4021	WY010 ~ WY401
R	R0000 ~ R07BF	WR000 ~ WRFFF
M	M0000 ~ M3FFF	WM000 ~ WM3FF
TC		TC000 ~ TC511
CL		CL000 ~ CL511

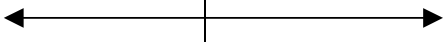
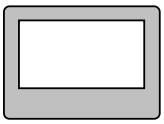
2.18 DELTA DVP Series

2.18.1 DELTA DVP-ES Serial Interface

The following section describes the system configuration and interface between DELTA DVP and PMU by serial RS-232.

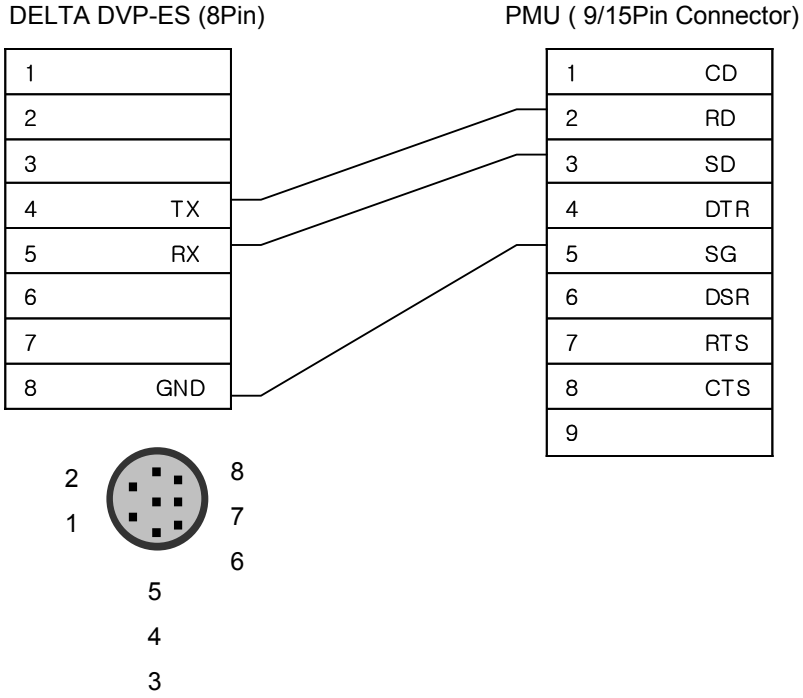
2.18.2 System Configuration

This figure shows system configuration to connect DELTA DVP-ES to PMU.

Controller	Comm. Module	Cable	PMU
			
DELTA DVP-ES	None	Refer to Connection Diagram(RS-232)	All PMU

2.18.2.1 Cable Diagram

(1) RS-232 Connection Diagram (DELTA DVP-ES ↔ PMU)



2.18.2.2 DELTA DVP-ES Setup

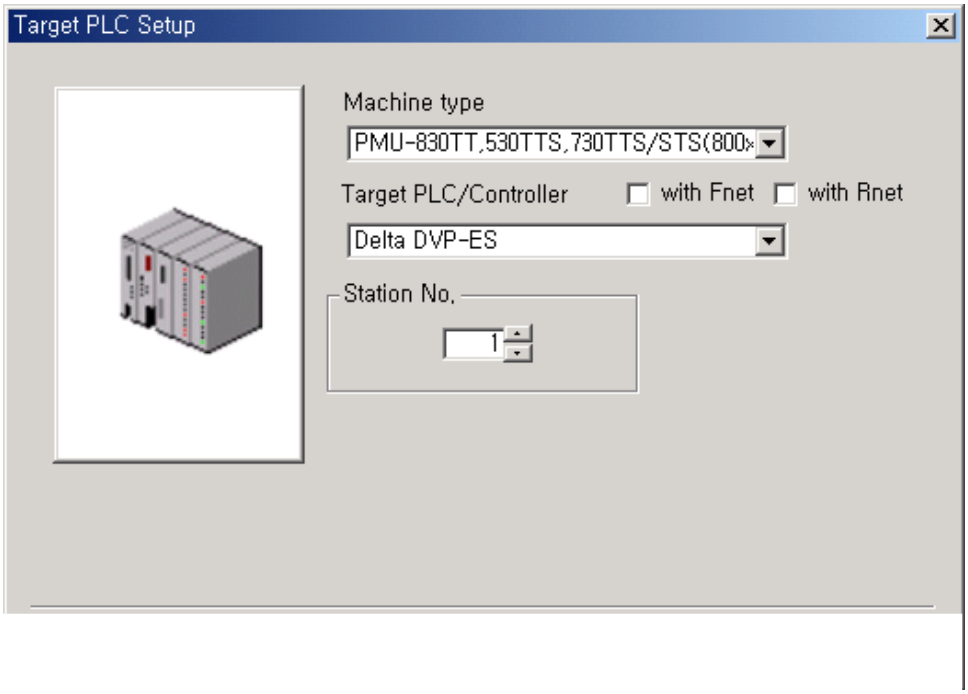
(1) DELTA DVP-ES Setup

PLC Setting	
Data Bit	7 bit or 8 Bit
Stop Bit	1
Parity Bit	Even
Baud Rate	9600 bps

2.18.2.3 PMU Setup

(1) PMU Editor Setup

Select Controller type of DELTA DVP-ES as shown figure.



(2) Serial setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level: Same as controller’s setup
- Station No. at Communication Diagnosis(0~31) : Same as controller’s setup

2.18.3 Available Address List

Controller's address to read/write from/to PMU is as following list.

Device	Range	Effective Range	Address
S	000~255	000~127	0000~00FF
S	246~511		0100~01FF
S	512~767		0200~02FF
S	768~1024		0300~03FF
X	000~377(Octal)	000~177(Octal)	0400~04FF
Y	000~377(Octal)	000~177(Octal)	0500~05FF
T	000~255	000~127	0600~06FF
M	000~255	0000~1279	0800~08FF
M	256~511		0900~09FF
M	512~767		0A00~0AFF
M	768~1023		0B00~0BFF
M	1024~1279		0C00~0CFF
C	000~255	000~127 232~255	0E00~0EFF
D	000~255	000~599 1000~1143	1000~10FF
D	256~511		1100~11FF
D	512~767		1200~12FF
D	768~1023		1300~13FF
D	1024~1279		1400~14FF

3. Interface of measurements and Controller

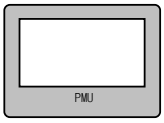
3.1 RKC SR-Mini Series

3.1.1 RKC SR-Mini Series interface

This section describes the system configuration and interface between the RKC CB/SR-Mini Series and PMU.

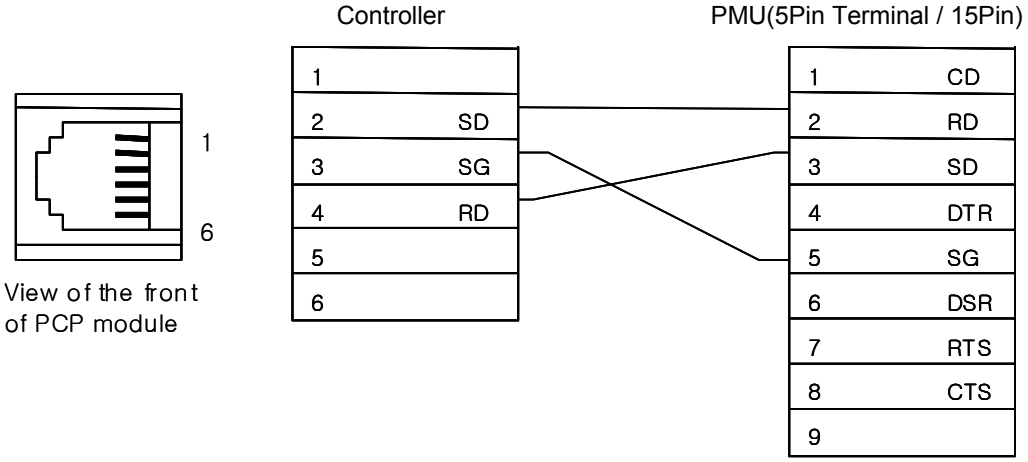
3.1.2 System Configuration

This figure shows system configuration to connect RKC CB/SR-Mini Series to PMU.

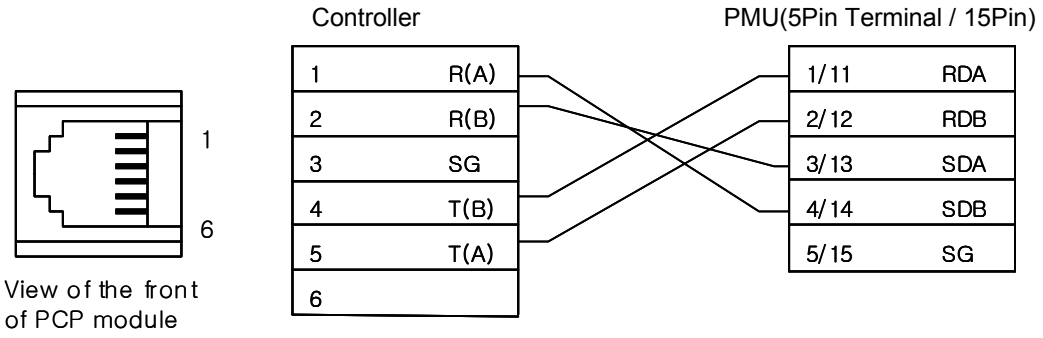
Controller	Comm. Unit	Cable	PMU
			
RKC SR-Mini	None	Refer to connection diagram RS-422 Refer to connection diagram RS-232	All PMU

3.1.2.1 Cable connection diagram

(1) RS-232 Cable connection diagram(RKC SR-Mini ↔ PMU Series)

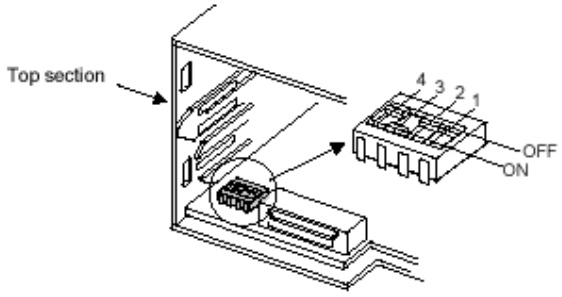


(2) RS-422 Cable connection diagram(RKC SR-Mini ↔ PMU)



3.1.2.2 RKC SR-Mini Setup

Communication parameters of RKC SR-Mini can be setup as following method.



1	2	Contents
OFF	OFF	8 bit, No parity *
OFF	ON	7 bit, Even parity
ON	OFF	7 bit, Odd parity
ON	ON	Non-used

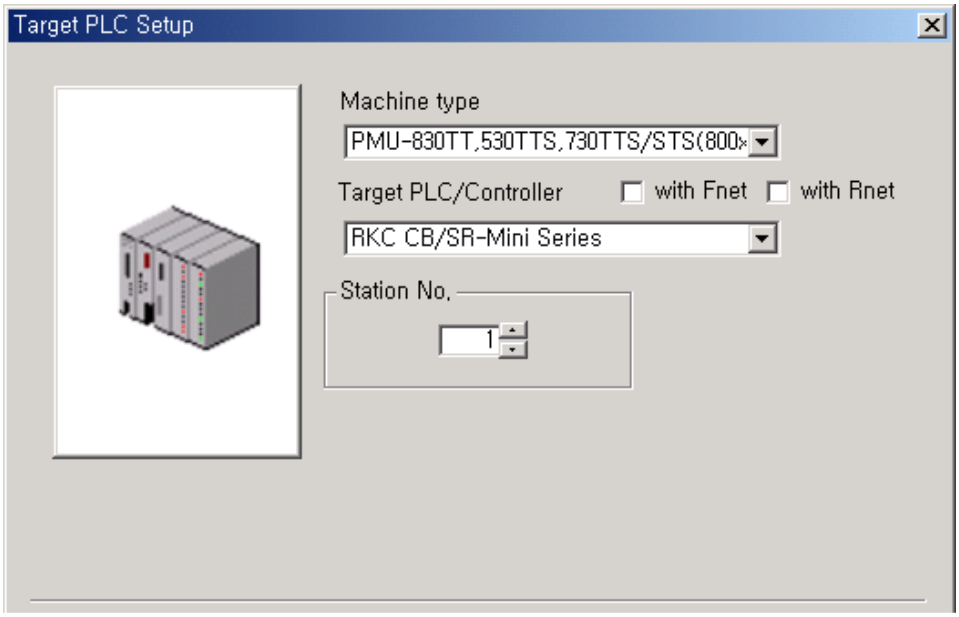
3	4	Baud Rate
OFF	OFF	2400 bps
OFF	ON	4800 bps
ON	OFF	9600 bps*
ON	ON	19200 bps

주 *) The default communication parameter of RKC SR-Mini

3.1.2.3 PMU setup

(1) PMU Editor setup

Select Controller type of “RKC CB/SR-Mini Series” as shown figure.



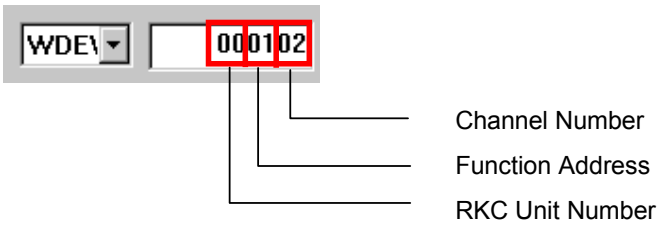
(2) Serial communication setup in PMU

Communication setup as follows:

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level : RS-232 or RS-485
- Station No : Same as controller’s setup

3.1.2.4 Addressing for RKC SR-Mini

The method to address of PMU for RKC SR-Mini can be setup as follows :



3.1.3 Available address list

DEVICE	Command Description	Command	Address	Read/Write
WDEV (WORD)	Measured value input	M1	0000	RO
	Manipulated output (Heat-side)	O1	0100	RO
	Manipulated output (Cool-side)	O2	0200	RO
	CT input measured value 1	M3	0300	RO
	CT input measured value 2	M4	0400	RO
	Set value monitor	MS	0500	RO
	Temperature set value	S1	0600	R/W
	Heat-side proportional band	P1	0700	R/W
	Cool-side proportional band	P2	0800	R/W
	Integral time	I1	0900	R/W
	Derivative time	D1	1000	R/W
	Deadband / Overlap	V1	1100	R/W
	First alarm set value	A1	1200	R/W
	Second alarm set value	A2	1300	R/W
	Heater break alarm (HBA) set value 1	A3	1400	R/W
	Heater break alarm (HBA) set value 2	A4	1500	R/W
	Heat-side proportioning cycle	T0	1600	R/W
	Cool-side proportioning cycle	T1	1700	R/W
	PV bias	PB	1800	R/W
	Manual output value	ON	1900	R/W
	Temperature rise completion range	HD	2000	R/W
	Temperature rise completion soak time	T3	2100	R/W

DEVICE	Command Description	Command	Address	Read/Write
	AI measured value (PV) input	M5	2200	R/W
	AI first alarm set value	A5	2300	R/W
	AI second alarm set value	A6	2400	R/W
	LBA time	C6	2500	R/W
	LBA deadband	V2	2600	R/W
	AO output value monitor	M6	2700	RO
	AO set value output	S6	2800	R/W
	AO function selection	XO	2900	R/W
	Setting of CH corresponding to AO	OY	3000	R/W
	AO zooming high limit	CV	3100	R/W
	AO zooming low limit	CW	3200	R/W
	AO zero point adjustment setting	JK	3300	R/W
	AO full scale adjustment setting	JL	3400	R/W
	DI module input condition	L1	3500	RO
	Event DO condition	Q3	3600	RO
	Event DO manual output value	Q4	3700	R/W
	Event DO extension alarm set value	A7	3800	R/W
	Cascade monitor	KH	3900	RO
	Cascade gain	KG	4000	R/W
	Cascade bias	KI	4100	R/W
	TI measured value (PV) input	M7	4200	RO
	TI first alarm set value	A8	4300	R/W
	TI second alarm set value	A9	4400	R/W
	TI module PV bias	PC	4500	R/W
	PCP module DI condition	L3	4600	RO
	Event DI input contact input monitor	L4	4700	RO
	Event DI input logic input monitor	L5	4800	RO
	Event DI input logic output	Q5	4900	RO
	Overall alarm condition	AJ	5000	RO
	Positioning monitor	M8	5100	RO
	Positioning output neutral zone	V3	5200	R/W
	Motor time	TJ	5300	R/W
	Integrated output limit	OS	5400	R/W
	Manual positioning output value	OO	5500	R/W

DEVICE	Command Description	Command	Address	Read/Write
BDEV	First alarm condition	AA	0000	RO
(BIT)	Second alarm condition	AB	0100	RO
	Burnout alarm condition	B1	0200	RO
	Heater break alarm	AC	0300	RO
	Temperature rise completion condition	HE	0400	RO
	Error code	ER	0500	RO
	PID / AT transfer	G1	0600	R/W
	Control response parameters	CA	0700	R/W
	Operation mode transfer	EI	0800	R/W
	Control Run / Stop	SR	0900	R/W
	Initialize setting mode	IN	1000	R/W
	Memory area number	ZA	1100	R/W
	Auto / Manual transfer	J1	1200	R/W
	Temperature rise completion trigger	HS	1300	R/W
	AI first alarm condition	AD	1400	RO
	AI second alarm condition	AE	1500	RO
	AI zero point correction	JI	1600	R/W
	AI full scale correction	JJ	1700	R/W
	AI operation mode transfer	NJ	1800	R/W
	LBA alarm condition	AP	1900	RO
	LBA use selection	HP	2000	R/W
	Control & Communication link, selecting flag	C2	2100	RO
	Cascade ON/OFF	KF	2200	R/W
	TI first alarm condition	AF	2300	RO
	TI second alarm condition	AG	2400	RO
	TI burnout alarm condition	B2	2500	RO
	TI operation mode transfer	EJ	2600	R/W
	CT module heater break alarm condition	AH	2700	RO
	Local / computer transfer	C1	2800	RO
BFUN	Alarm interlock release	AR	0000	WO

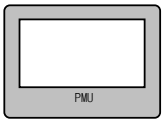
3.2 UX100/NX/PX Series

3.2.1 UX100/NX/PX Series Interface

This section describes the system configuration and interface between the UX100/NX/PX Series and PMU.

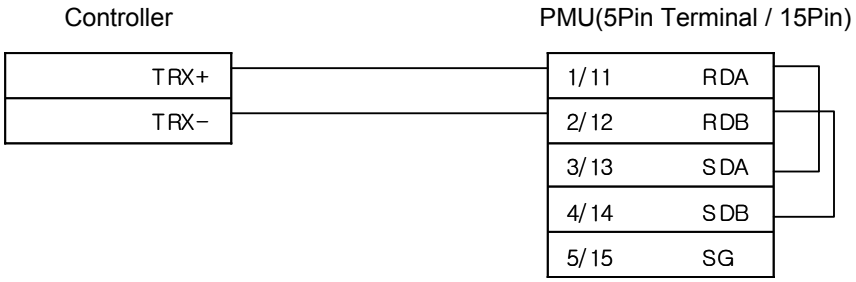
3.2.2 System Configuration

This figure shows system configuration to connect UX100/NX/PX Series to PMU.

Controller	Comm. Unit	Cable	PMU
			
UX100/NX/PX	None	Refer to cable diagram RS-485	All PMU

3.2.2.1 Cable connection diagram

(1) RS-485 cable connection diagram(UX100/NX/PX ↔ PMU)



3.2.2.2 UX100/NX/PX Setup

Controller Setup	
Baud Rate	9600 bps
Data Bit	8 bit
Stop Bit	1 bit
Parity Bit	NONE
Link SUM	0 (None)

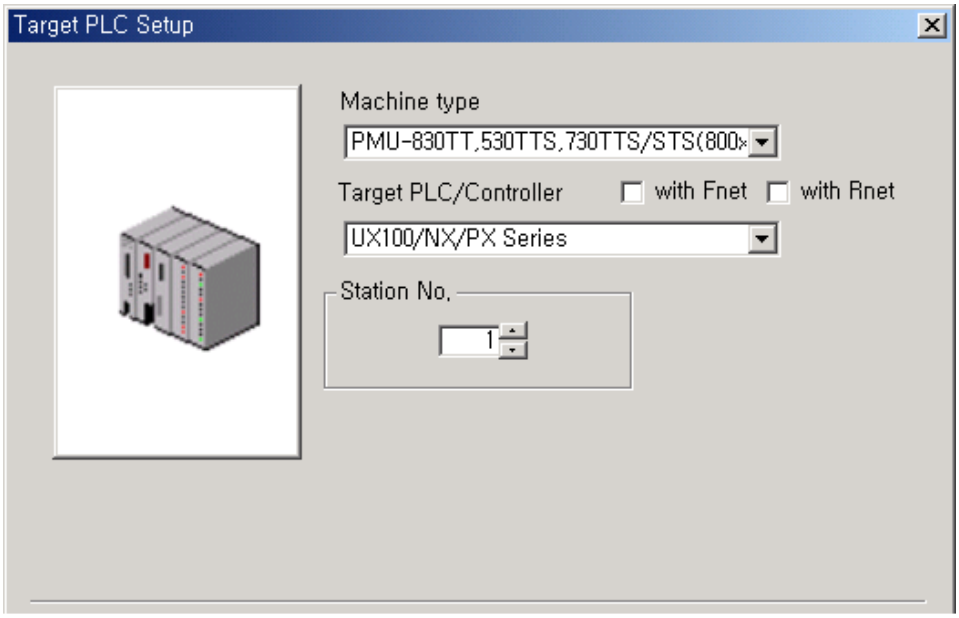
Communication parameters of UX100/NX/PX can be set using display at the font of UX100/NX/PX as follows :

Item	Contents	Value
Protocol	PC LINK	0
Baud Rate	9600	4
Parity	NONE	0
Stop bit	1 bit	1
Data bit	8 bit	8
Address (station No.)	1 ~ 99	-

3.2.2.3 PMU Setup

(1) PMU Editor Setup

Select Controller type of “UX100/NX/PX Series” as shown figure.



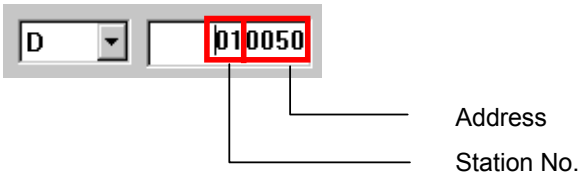
(2) Serial communication setup in PMU

Communication setup as follows:

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level :RS-485
- Station No : Same as controller’s setup

3.2.2.4 Addressing method of PMU for UX100/NX/PX

The method to address of PMU for UX100/NX/PX can be setup as follows :



3.2.3 Available address list

Device	Address	Contents	
D	**Read only and User area (0001 ~ 0099)**		
	0001	NPV	Current PV value
	0002	NSV	Current running SV value
	0003	NRSV	Current running Remote SV value
	0005	MVOUT	Current output
	0006~0007	CH1,2OUT	Output in HV-TYPE
	0008	PIDNO	Current running PID No.
	0009	ALMSTS	Current alarm status (BIT value)
	0010	STEPNO	Current STEP No. in program running
	0011	BRSEGTM	Current remanded time of STEP in program running
	0014~0015	HC1,2CUR	HEATER CUT value
	0016	ADESTS	Input process error information
	0017	ERRSTS	Input or AT error information
	0018	MODSTS	Current operating status information
	0050~0099		User area
	Operating status confirm / transfer (0100 ~ 0199)		
	0100	OPMODE	0:Local, 1:Program, 2:Remote
	0101	PROG	0:Reset, 1:Program Run
	0102	ZOM	0:Zoom off, 1:Zoom on
	0103	FUZY	0:Fuzzy Off, 1:Fuzzy On
	0104	ARW	0:ARW Off, 1:ARW On
	0105	DISL	DI selection
	ETC		
	0200~0299	Programming part	
	0300~0399	SV setup or PID setup	
	0400~0499	Alarm parameter setup	
	0500~0599	Transfer or remote parameter or communication parameter setup (0510 -0516 :Read Only)	
	0600~0699	Input/output parameter setup	

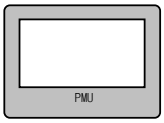
3.3 CERSA-MCI LSN

3.3.1 CERSA-MCI LSN interface

The following section describes the system configuration and interface between CERSA-MCI LSN and PMU by serial RS-232 or RS-485.

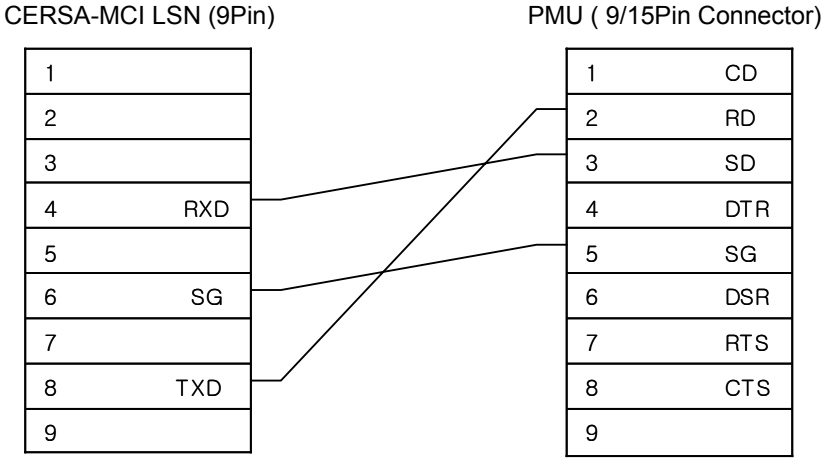
3.3.2 System Configuration

This figure shows system configuration to connect CERSA-MCI LSN to PMU.

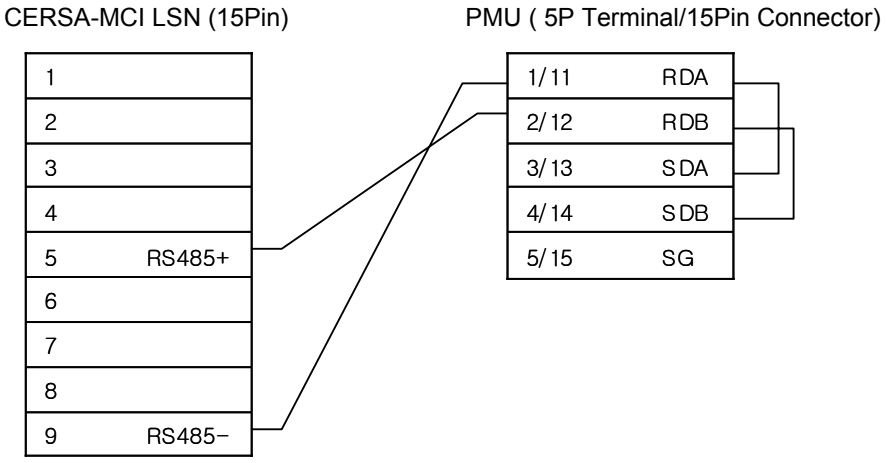
<table>
<tr><th>Controller</th><th>Comm. Module</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td></td><td></td><td> 
</td></tr>
<tr><td rowspan="2">CERSA-MCI LSN</td><td rowspan="2">None</td><td>Refer to Connection Diagram(RS-232)</td><td rowspan="2">All PMU</td></tr>
<tr><td>Refer to Connection Diagram (RS-485)</td></tr>
</table>

3.3.2.1 Cable Diagram

(1) RS-232 Connection Diagram (CERSA-MCI LSN ↔ PMU)



(2) RS-485 Connection Diagram (CERSA-MCI LSN ↔ PMU)



3.3.2.2 CERSA-MCI LSN Communication Setup

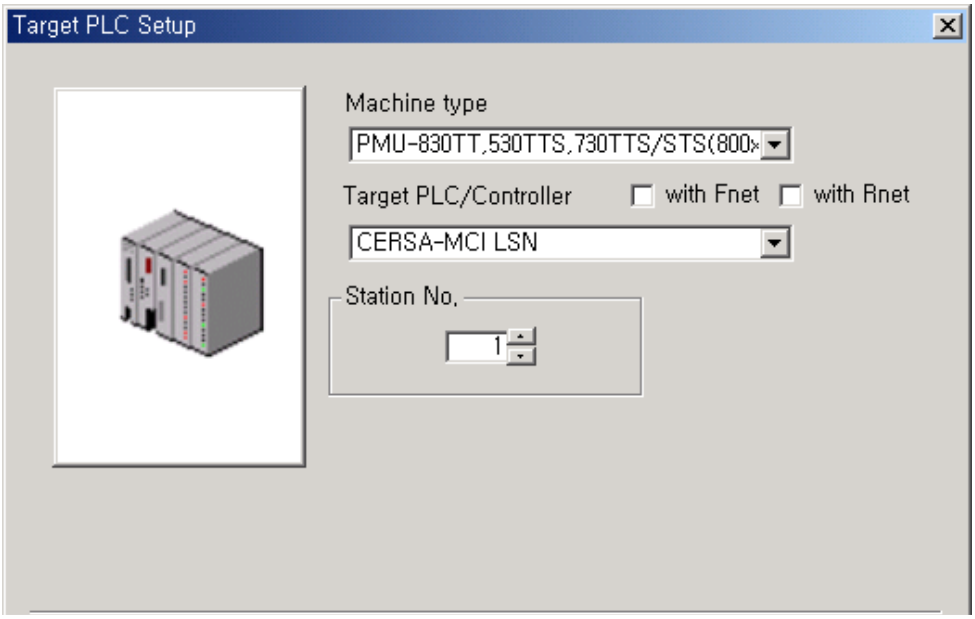
Default communication settings for LSN are as following table.

Communication Setup	
Baud rate	38400 bps
Data Bit	8 bit
Stop Bit	1 bit
Parity Bit	None

3.3.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of CERSA-MCI LSN Series as shown figure.



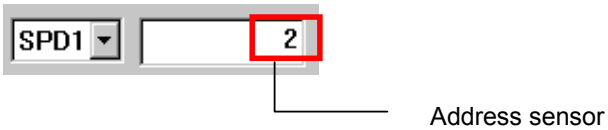
(2) Serial communication setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level : Same as controller’s setup
- Station No. at Communication Diagnosis(0~31) : Same as controller’s setup

3.3.2.4 Address sensor Setup

Address sensor can be set separately for all devices of CERSA-MCI LSN and is composed of 2 digits from 0 to 99 as followings.



3.3.2.5 Data setup (Data write)

In data setup of CERSA-MCI LSN, it is impossible to input single data using 'Key Display' tag. In order to set data of items such as Line Configuration, Diameter and Speed, all data for each item has to be set at the same time using 'Comm(z)' Tag. The method of data setup is as follows.

(1) Selection and setup of Tag for data setup

First of all, several 'Key Display' tags should be selected enough to display all data (For example, in case of Speed data, 3 Key display tags is need to display 'Nominal / Lower / Upper speed) and system buffer address be assigned to for the address of 'Key display' tag.

Note : In assigning address of system buffer, address of 'Key display' tags must have continuous address as like 100, 101, 102.

Select 'Touch' tag and assign condition to trigger 'Comm(Z)' tag. (For example, the condition of touch operation is ON on 'touch' for 0^{th} bit of system buffer address 200).

Select 'Comm(z)' tag and assign triggering condition in accordance with the above (2) conditions. Operation items are listed as follows.

Comm. Type : Write (THIS => PLC)

Start Addr. In PLC : Data item to be set(in case of Speed, Start Addr. In PLC has to be set as SPD1)

No. of Word : Number of data for item(in case of Speed, No. of Word is 3 – Nominal, Upper, Lower speed)

Start system buffer : System address to be assigned as the above (1).

(2) The method of data setup

After selecting and assigning tags, the method of data setup is as following.

Enter all data of item using 'Key display' tag.

If pressing 'Touch', all data setup will be done.

(3) The example of Data setup (Data write)

The example of Line Configuration setup

Key Display Tag : system buffer address from 300 to 304(address 300 and 304 is set to 32bit. Address 300 and 304 are respectively allocated to LIN1 and LIN4)

Touch Tag : The triggering condition of Comm(z) tag is ON 'touch' for 0^{th} bit of system buffer address 400

Comm(z) Tag :

* Triggering condition : 'ON' condition for 0^{th} bit of system buffer address 400
* Start Addr. in PLC : LIN1
* No. of Word : 4
* Start system buffer - 300

(4) The example of Diameter setup

Key Display Tag : system buffer address from 310 to 312. Address 310 to 312 are respectively allocated to DIA1 to DIA3

Touch Tag : The triggering condition of Comm(z) tag is ON 'touch' for 1^{st} bit of system buffer address 400

Comm(z) Tag :

* Triggering condition : 'ON' condition for 1^{st} bit of system buffer address 400
* Start Addr. in PLC : DIA1
* No. of Word : 3
* Start system buffer - 310

(5) The example of Speed setup

Key Display Tag : system buffer address from 320 to 322. Address 320 to 322 are respectively allocated to SPD1 to SPD3

Touch Tag : The triggering condition of Comm(z) tag is ON 'touch' for 2^{nd} bit of system buffer address 400

Comm(z) Tag :

* Triggering condition : 'ON' condition for 2^{nd} bit of system buffer address 400
* Start Addr. in PLC : SPD1
* No. of Word : 3
* Start system buffer : 320

(6) The example of Spool Length setup

Key Display Tag : system buffer address 330 (32bit). Address 330 is allocated to SPLL

Touch Tag : The triggering condition of Comm(z) tag is ON 'touch' for 3th bit of system buffer address 400

Comm(z) Tag :

* Triggering condition : 'ON' condition for 3th bit of system buffer address 400
* Start Addr. in PLC : SPLL
* No. of Word : 1
* Start system buffer : 330

3.3.3 Available Device List

Item	DEVICE	Command
Line Configuratoin	LIN1	Length statistics
	LIN2	Capstan Diameter
	LIN3	Capstan Pulse
	LIN4	Shift Correction
	LIN5	Address sensor
Diameter	DIA1	Nominal Diameter
	DIA2	Lower Limit Diameter
	DIA3	Upper Limit Diameter
Speed	SPD1	Nominal Speed
	SPD2	Lower Limit Speed
	SPD3	Upper Limit Speed
Spool length	SPLL	Spool Length Limit
	SPLC	Spool Length Count
Current parameter	CDIA	Current Diameter
	CALM	Current Alarm
	CSPD	Current Speed
	CSPL	Current Spool Length
Statistics	STC1	The number of diameter measures in the group since last read statistics command
	STC2	The minimum diameter of the group
	STC3	The maximum diameter of the group
	STC4	Standard Deviation
	STC5	Variance
Ovality	OVL1	The average diameter during the last rotation cycle
	OVL2	The minimum diameter during the last rotation cycle
	OVL3	The maximum diameter during the last rotation cycle
	OVL4	The difference between the maximum and the minimum diameter
	OVL5	The number of diameter measures during the last rotation cycle

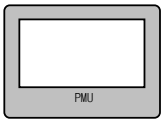
3.4 AND WEIGHING INDICATOR Series

3.4.1 AND WEIGHING INDICATOR Interface

The following section describes the system configuration and interface between AND Weighing Indicator and PMU by serial RS-232 / RS-485.

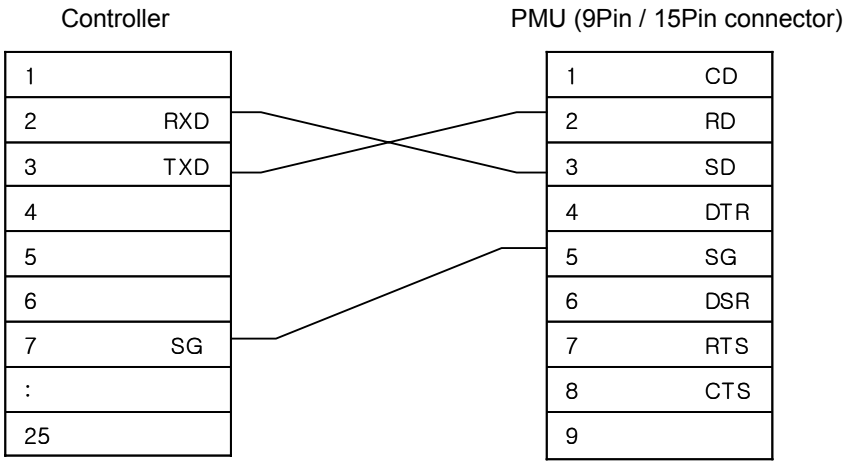
3.4.2 System Configuration

This figure shows system configuration to connect AND Weighing indicator to PMU.

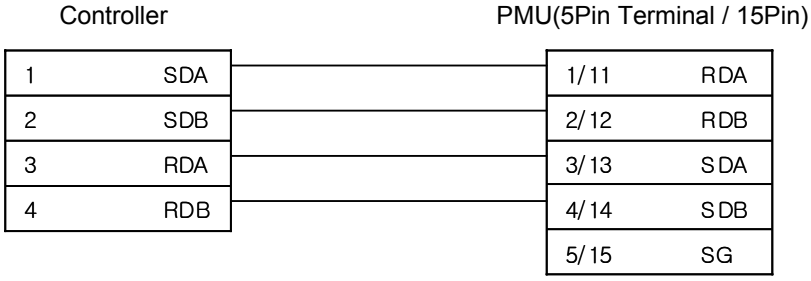
<table>
<tr><th>Controller</th><th>Comm. Unit</th><th>Cable</th><th>PMU</th></tr>
<tr><td> </td><td></td><td></td><td> 
</td></tr>
<tr><td rowspan="2">AND Weighing Indicator</td><td>OP03 (option module)</td><td>Refer to connection diagram RS422/485</td><td rowspan="2">All PMU</td></tr>
<tr><td>OP04 (option module</td><td>Refer to connection diagram RS232</td></tr>
</table>

3.4.2.1 Cable Connection Diagram

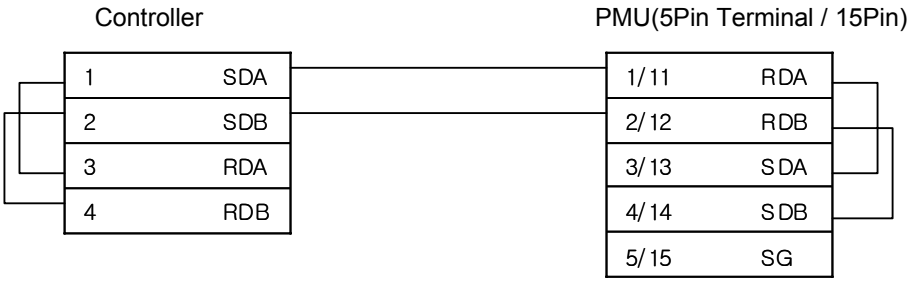
(1) RS-232 connection diagram(AND Weighing Indicator ↔ PMU)



(2) RS-422 connection diagram(AND Weighing Indicator ↔ PMU)



(3) RS-485 connection diagram(AND Weighing Indicator ↔ PMU)



3.4.2.2 AND WEIGHING INDICATOR Setup

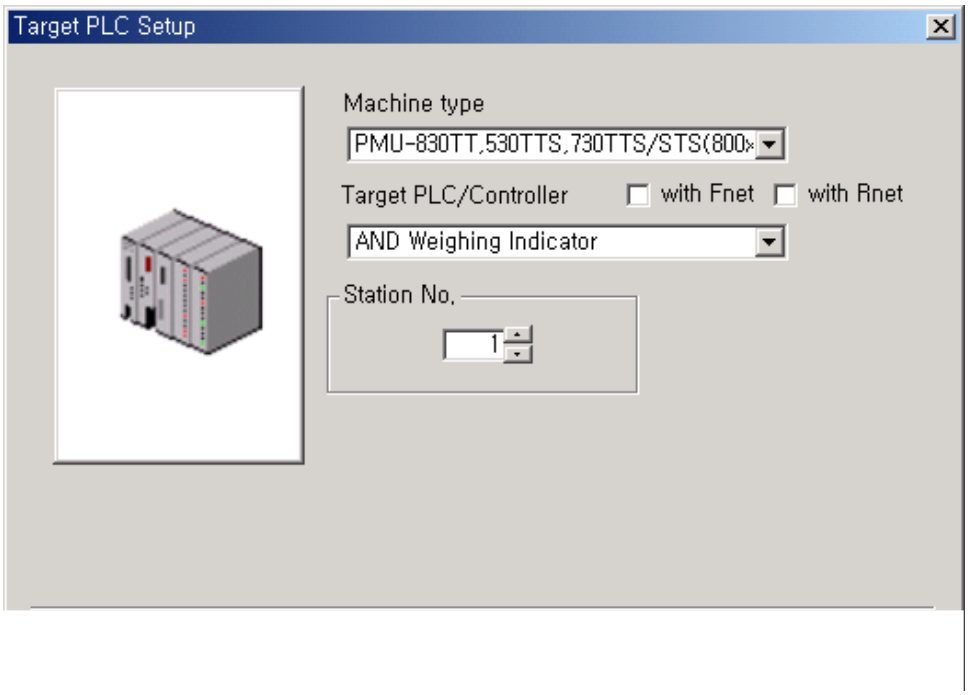
CONTROLLER	
No Address	
Address exist	Only for RS422/485
Address	Only for RS422/485
Baud Rate	9600 bps
Data Bit	7 bit
Stop Bit	1 bit
Parity Bit	EVEN

Communication parameters of AND Weighing Indicator can be set using display panel on the front of indicator.

3.4.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of “AND Weighing Indicator” as shown figure.



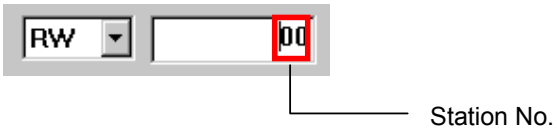
(2) Serial communication setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level : Same as controller’s setup
- Station No. at Communication Diagnosis(0~31) : Same as controller’s setup

3.4.2.4 Addressing Method of PMU for AND Weighing Indicator

The address of PMU for AND Weighing Indicator means station number in case of using RS422 / 485 serial interface. Therefore, when PMU is connected to controller with RS-232, address of PMU for AND weighing indicator should be zero (00)



3.4.3 Available Address List

DEVICE	Command	Read/Write	Address
RW	Data request	R	-
MZ	Zero display	W	-
MT	Tare	W	-
CT	Clear Tare value	W	-
MG	Display gross value	W	-
MN	Display net value	W	-
Hi	Set upper limit value	W	-
Lo	Set lower limit value	W	-
S0	Set final value	W	-
S1	Set free fall value	W	-
S2	Set preliminary value	W	-
S3	Set zero band	W	

4. Interface of Inverters and motion controllers

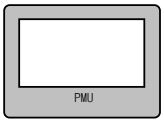
4.1 MELSEC FX2N-20GM

4.1.1 MELSEC FX2N-20GM Interface

The following section describes the system configuration and interface between Mitsubishi MELSEC FX2N-20GM and PMU by serial RS-422.

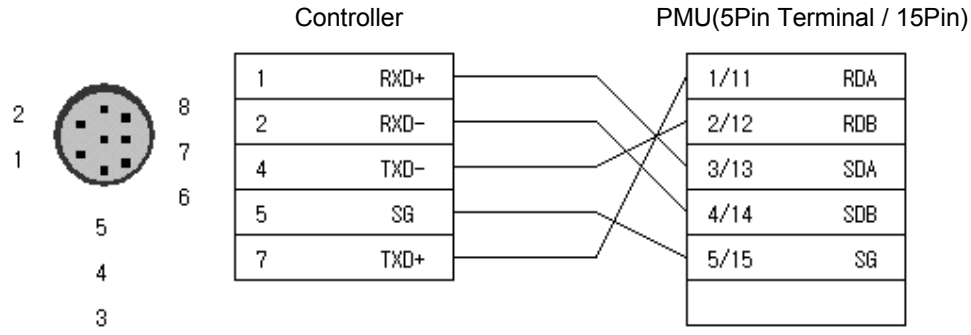
4.1.2 System Configuration

This figure shows system configuration to connect MELSEC FX2N-20GM to PMU.

Contoller	Comm. Unit	Cable	PMU
			
FX2N-20GM	None	Refer to connection diagram (RS-422)	All PMU

4.1.2.1 Cable Connection Diagram

(1) RS-422 connection diagram(FX2N-20GM ↔ PMU)



(View of the front connector of cable(Male))

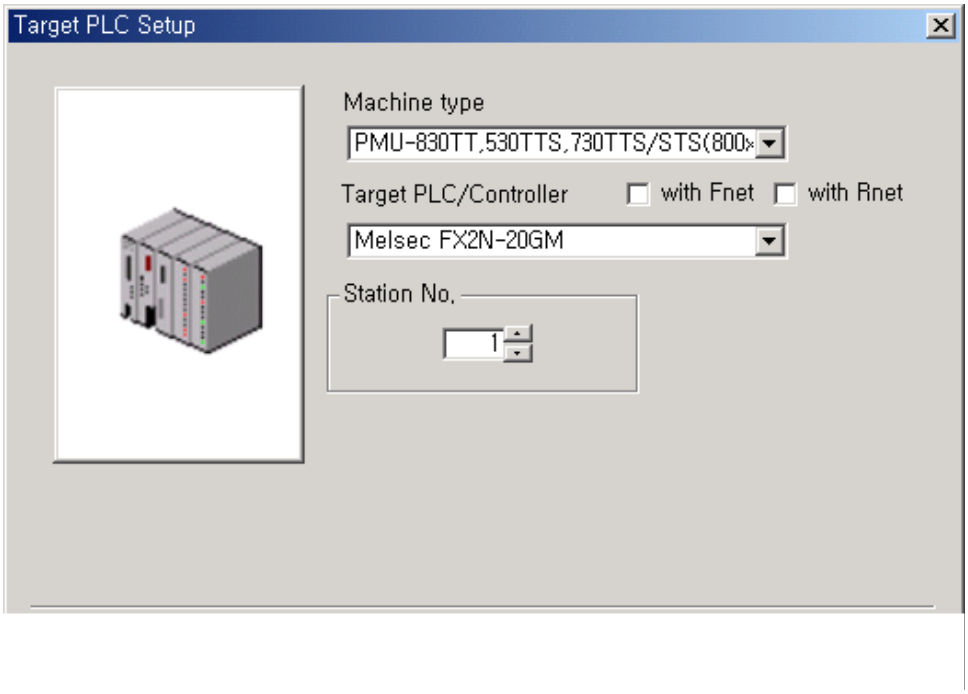
4.1.2.2 MELSEC FX2N-20GM Setup

It is not necessary to setup MELSEC FX2N-20GM.

4.1.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of “Melsec FX2N-20GM” as shown figure.



(2) Serial communication setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

- Serial Baud Rate : 9600 bps
- Serial Data Bit : 8 bit
- Serial Stop Bit : 1 bit
- Serial Parity Bit : EVEN
- Serial Signal Level : RS-422
- Station No. at Communication Diagnosis(0~31) : Non-used

4.1.3 Available Address List

Device	Type	Bit Address	Word Address
Input (X)	Bit	X0000 ~ X0067 X0372 ~ X0377	X0000 ~ X0067 X0372 ~ X0377
Output (Y)	Bit	Y0000 ~ Y0067	Y0000 ~ Y0067
Internal relay (M)	Bit	M0000 ~ M0511	M0000 ~ M0511(1)
Special relay (M)	Bit	M9000 ~ M9175	M9000 ~ M9175(1)
Data Resister (D)	Word		D0000 ~ D3999
File Resister (D)	Word		D4000 ~ D6999(2)
Special Resister (D)	Word		D9000 ~ D9599

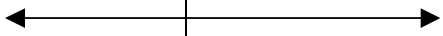
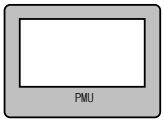
4.2 ABB INVERTER ACS140/400 Series

4.2.1 ABB INVERTER ACS140/400 Series interface

The following section describes the system configuration and interface between ABB Inverter ACS140/400 and PMU by serial RS-485.

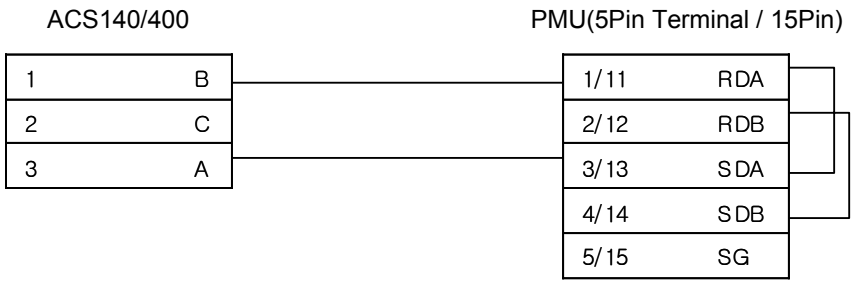
4.2.2 System Configuration

This figure shows system configuration to connect ABB Inverter ACS140/400.

Controller	Comm. Module	Cable	PMU
			
ACS140	RS485/232 Adapter	Refer to connection diagram	All PMU
ACS400	None		

4.2.2.1 Cable Diagram

(1) RS-485 Connection Diagram(ACS140/400 Series ↔ PMU)



4.2.2.2 ABB INVERTER ACS140 Series Setup

Inverter Setup	
Baud Rate	9600 bps
Data Bit	8 bit
Stop Bit	2 bit
Parity Bit	NONE

Baud Rate for serial communication of ABB Inverter 140 can be set using DIP switch on RS485/RS232 Adapter as following.

Switch	Item	Switch On / Off						
	Baudrate(bps)	300	600	1200	2400	4800	9600	19200
SW1	On / Off	OFF	ON	OFF	ON	OFF	ON	OFF
SW2		OFF	OFF	ON	ON	OFF	OFF	ON
SW3		OFF	OFF	OFF	OFF	ON	ON	ON

Serial communication mode of ABB Inverter 140 can be set using jumper S5 on the RS485/RS232 Adapter as following. Serial communication mode should be set RS-485 as shown in the above figure.

Item	Jumper Location
	RS 485
Jumper S5	

When “Mode” of ABB Inverter 140 is changed into “REM” using control panel (ACS100-PAN), RS-485 serial communication for ABB Inverter 140 can be available.

4.2.2.3 ABB INVERTER ACS400 Series Setup

Inverter Setup	
Baud Rate	9600 bps
Data Bit	8 bit
Stop Bit	2 bit
Parity Bit	NONE

In ABB Inverter ACS 400 Series, channel 1 is used for serial communication with peripheral equipments including PMU. Serial communication parameters of channel 1 for ABB Inverter ACS 400 series can be setup using control panel (ACS-PAN / ACS100-PAN) as following.

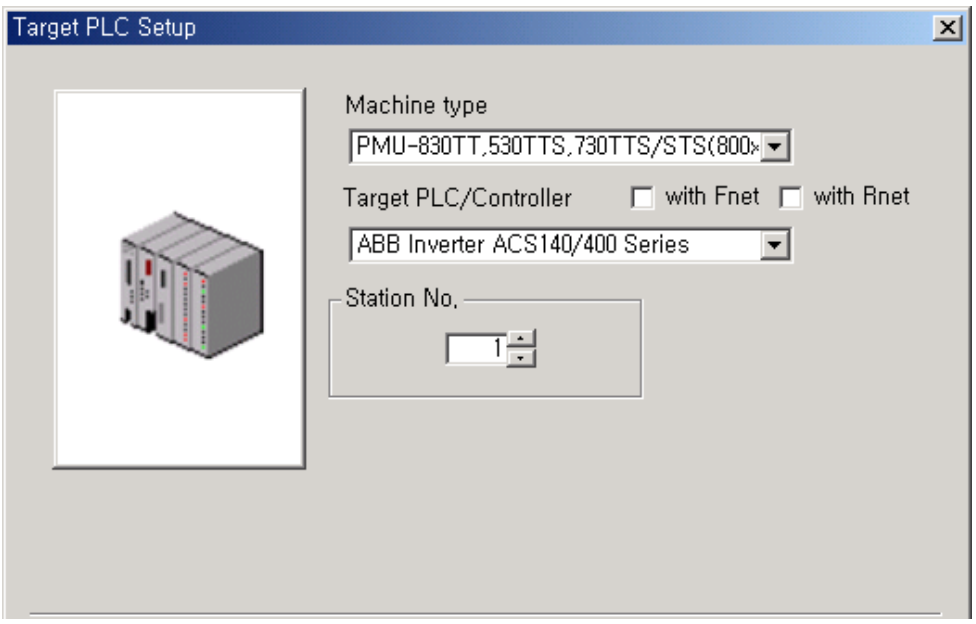
Code	Parameter	Valid value	Default
Group 52			
5201	Station Number	1 ~ 247	1
5202	Baud Rate	96 = 9600 bps 192 = 19200 bps	96
5203	Parity Bit	0 = NONE 1 = EVEN 2 = ODD	0
Group 50			
5005	Protocol	0 = No Selection 1 = DDCS 2 = STD MODBUS 3 = STD MOD + DDCS	Remark (1)
5006	Communication Command	0 = No Selection 1 = STD MODBUS 2 = DDCS	Remark (2)

Remarks (1) : “STD MODBUS” or “STD MODBUS + DDCS” must be chosen in protocol setup.
Remarks (2) : In order to use communication command by peripheral equipments including PMU, “STD MODBUS” has to be selected in item of communication command.

4.2.2.4 PMU Setup

(1) PMU Editor setup

Select Controller type of ABB Inverter ACS140/400 Series as shown figure.



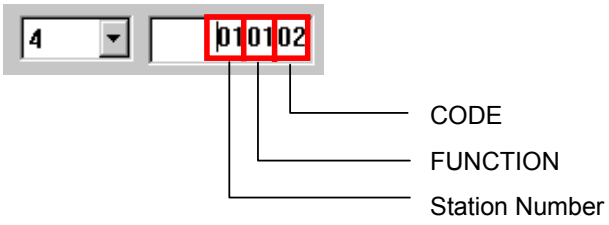
(2) Serial communication setup in PMU

Communication setup in 'Comm. Setup' Menu are as follows :

- Serial Baud Rate : Same as controller's setup
- Serial Data Bit : Same as controller's setup
- Serial Stop Bit : Same as controller's setup
- Serial Parity Bit : Same as controller's setup
- Serial Signal Level : RS-485
- Station No. at Communication Diagnosis(0~31) : Same as controller's setup

4.2.2.5 Address setup

Address of ABB Inverter ACS140/400 series can be setup as follows.



4.2.3 Available Address List

- ACS140 Series

Device	Group	Address(HEX)
4	Start-Up Data	9900 ~ 9999
	Operating Data	0100 ~ 0199
	Command Input	1000 ~ 1099
	Reference Select	1100 ~ 1199
	Constant Speeds	1200 ~ 1299
	Analogue Inputs	1300 ~ 1399
	Relay Outputs	1400 ~ 1499
	Analogue Outputs	1500 ~ 1599
	System Controls	1600 ~ 1699
	Limits	2000 ~ 2099
	Start / Stop	2100 ~ 2199
	Accel / Decel	2200 ~ 2299
	Critical Freq.	2500 ~ 2599
	Motor Control	2600 ~ 2699
	Fault Functions	3000 ~ 3099
	Automatic Reset	3100 ~ 3199
	Supervision	3200 ~ 3299
	Information	3300 ~ 3399
	PID Control	4000 ~ 4099

- ACS400 Series

Device	Group	Address(HEX)
4	Start-Up Data	9900 ~ 9999
	Operating Data	0100 ~ 0199
	Command Input	1000 ~ 1099
	Reference Select	1100 ~ 1199
	Constant Speeds	1200 ~ 1299
	Analogue Inputs	1300 ~ 1399
	Relay Outputs	1400 ~ 1499
	Analogue Outputs	1500 ~ 1599
	System Controls	1600 ~ 1699
	Limits	2000 ~ 2099
	Start / Stop	2100 ~ 2199
	Accel / Decel	2200 ~ 2299
	Critical Freq.	2500 ~ 2599
	Motor Control	2600 ~ 2699
	Fault Functions	3000 ~ 3099
	Automatic Reset	3100 ~ 3199
	Supervision	3200 ~ 3299
	Information	3300 ~ 3399
	Process Variables	3400 ~ 3499
	PID Control	4000 ~ 4099
	PID Control2	4100 ~ 4199
	Communication	5000 ~ 5099
	EXT Comm Module	5100 ~ 5199
	Standard MODBUS	5200 ~ 5299
	PFC Control	8100 ~ 8199

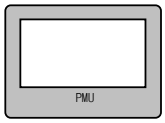
4.3 IMO VXM/VXSM INVERTER Series

4.3.1 IMO VXM/VXSM INVERTER Series Interface

The following section describes the system configuration and interface between VXM/VXSM Inverter and PMU by serial RS-485.

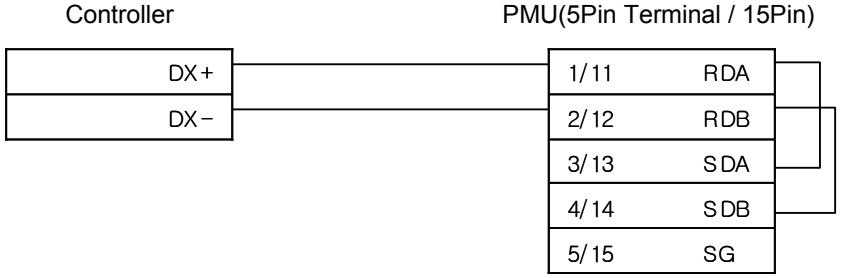
4.3.2 System Configuration

This figure shows system configuration to connect VXM / VXSM Inverter.

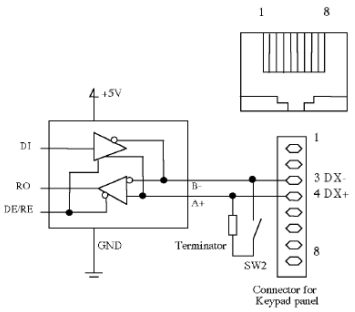
Controller	Comm. Unit	Cable	PMU
			
VXM, VXSM	None	Refer to connection diagram (RS-485)	All PMU

4.3.2.1 Cable Connection Diagram

(1) RS-485 Connection Diagram(VXM/VXSM Series ↔ PMU)



* VXSM Connector (Front view of inverter)



4.3.2.2 VXM/VXSM Setup

INVERTER Setup	
Baud Rate	19200, 9600 bps
Data Bit	8, 7 bit
Stop Bit	2, 1 bit
Parity Bit	NONE
Link SUM	0 (None)

Communication parameters of VXM / VXSM can be setup using key pad of inverter as follows :

Item	Function	Content	Range	Default Value
Station No.	H31	ADDRESS	1 ~ 31	1
Baud Rate	H34	BAUD RATE	19200,9600 bps	9600 bps
Data Bit	H35	LENGTH	8,7 Bit	8 Bit
Parity Bit	H36	PARITY	None/Even/Odd	None
Stop Bit	H37	STOP BITS	2,1 Bit	2 Bit

(1) Operation Mode Setup

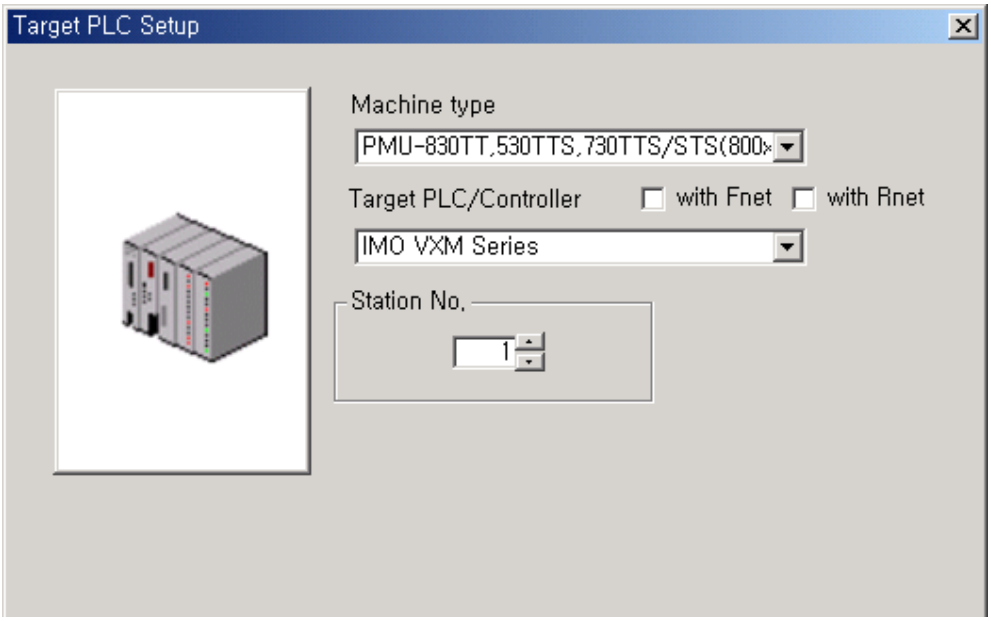
In order to communicate with PMU, operation mode of VXM / VXSM (F02) has to be set to 1

.

4.3.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of IMO VXM Series as shown figure.



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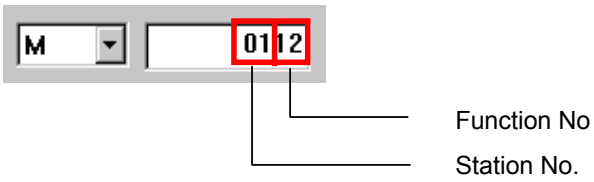
(2) Serial communication setup in PMU

Communication setup in 'Comm. Setup' Menu are as follows :

- Serial Baud Rate : Same as controller's setup
- Serial Data Bit : Same as controller's setup
- Serial Stop Bit : Same as controller's setup
- Serial Parity Bit : Same as controller's setup
- Serial Signal Level : RS-485
- Station No. at Communication Diagnosis(0~31) : Same as controller's setup

4.3.2.4 Addressing Method

Address of VXM / VXSM Inverter can be setup as follows.



4.3.3 Available Function List

Function Code	Name	Address
F	Fundamental Function	F00 ~ F49
E	Extension Terminal Functions	E00 ~ E49
C	Control Functions of Frequency	C00 ~ C49
P	Motor Parameters	P00 ~ P49
H	High Performance Functions	H00 ~ H49
A	Alternative Motor Parameters	A00 ~ A49
S	Command Data	S00 ~ S49
M	Monitor Data	M00 ~ M49

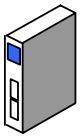
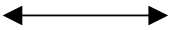
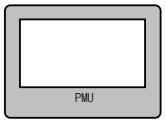
4.4 LG Inverter SV-iG5

4.4.1 LG SV-iG5 SERIES Interface

The following section describes the system configuration and interface between LG SV-iG5 Inverter and PMU by serial RS-485.

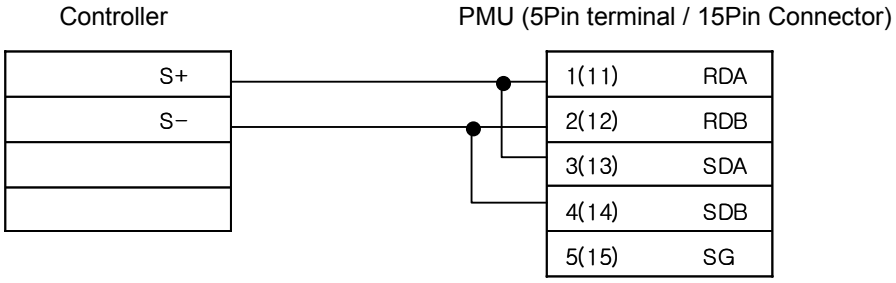
4.4.2 System Configuration

This figure shows system configuration to connect LG SV-iG5 Inverter.

Controller	Comm. Unit	Cable	PMU
			
LG SV-iG5	None	RS 485	All PMU

4.4.2.1 Cable Connection Diagram

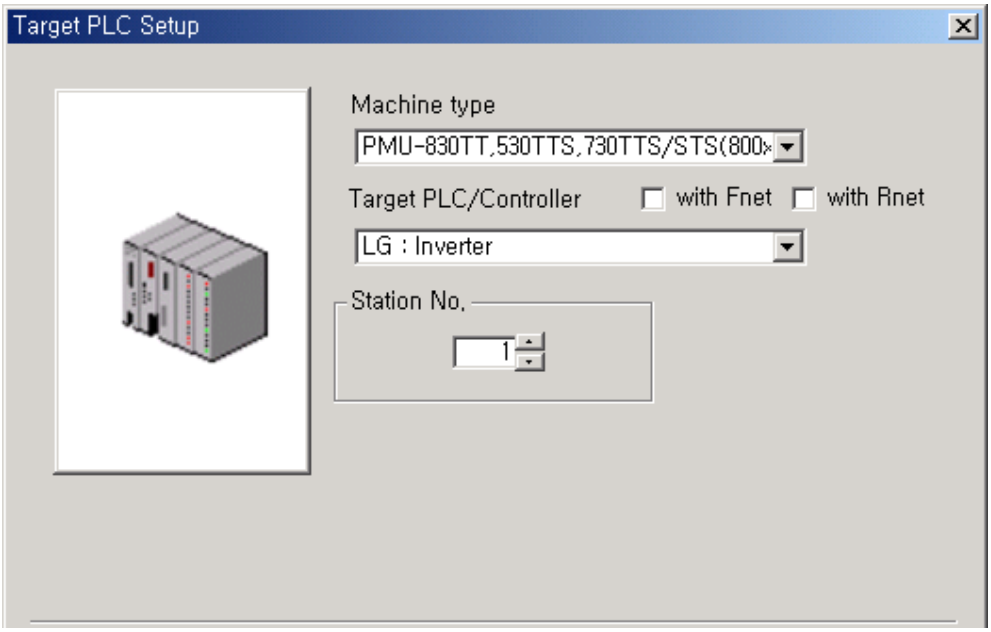
RS-485 Connection Diagram(LG SV-iG5 ↔ PMU)



4.4.2.2 PMU Setup

(1) PMU Editor setup

Select Controller type of LG: Inverter as shown figure.



(2) Serial communication setup in PMU

Communication setup in 'Comm. Setup' Menu are as follows :

- Serial Baud Rate : Same as controller's setup
- Serial Data Bit : Same as controller's setup
- Serial Stop Bit : Same as controller's setup
- Serial Parity Bit : Same as controller's setup
- Serial Signal Level : RS-485
- Station No. at Communication Diagnosis(0~31) : Same as controller's setup

4.4.2.3 LG SV-iG5 Controller Setup

Inverter	
Baud Rate	19,200 / 9,600 bps
Data Bit	8 bit
Stop Bit	1 bit
Parity Bit	NONE

4.4.3 Available Address List

Operand	Group	Type	Address
I	Parameter Code	Word	0000 - 0015
I	DRV Group	Word	6100 – 610A
I	FU1 Group	Word	6203 – 623C
I	FU2 Group	Word	6307 - 635E
I	I/O Group	Word	6401 - 6431

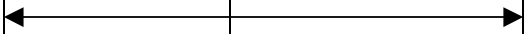
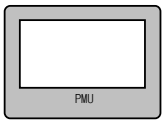
4.5 Supermizer HJMX Controller

4.5.1 Supermizer HJMX Controller interface

The following section describes the system configuration and interface between HJMX Controller and PMU by RS-485.

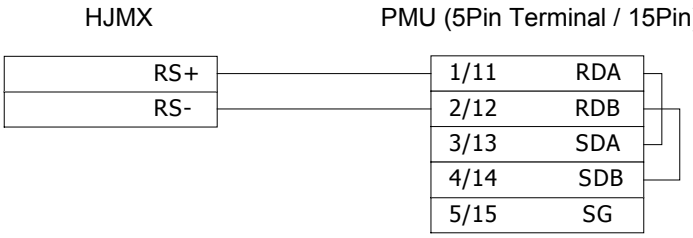
4.5.2 System Configuration

This figure shows system configuration to connect HJMX to PMU.

Controller	COMM. Module	Cable	PMU
			
HJMX	None	Refer to Connection Diagram	All PMU

4.5.2.1 Cable Connection Diagram

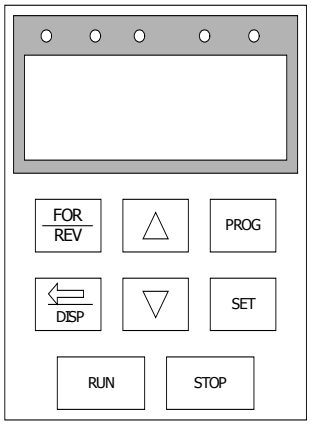
(1) RS-485 Cable Connection Diagram (HJMX ↔ PMU)



4.5.2.2 HJMX Setup

HJMX Communication Setup	
Baudrate	9600/19200/38400 bps
Data Bit	8 bit (fixed)
Stop Bit	1 bit (fixed)
Parity Bit	NONE/EVEN/ODD
Unit No	1 ~ 250

Communication parameter of the HJMX setup as follows:



1) Unit Number Setup : CD 160 01 ~ 250

2) Baud rate Setup

CD 161	1	2	3
Baud rate(bps)	9600	19200	38400

3) Communication Mode Setup

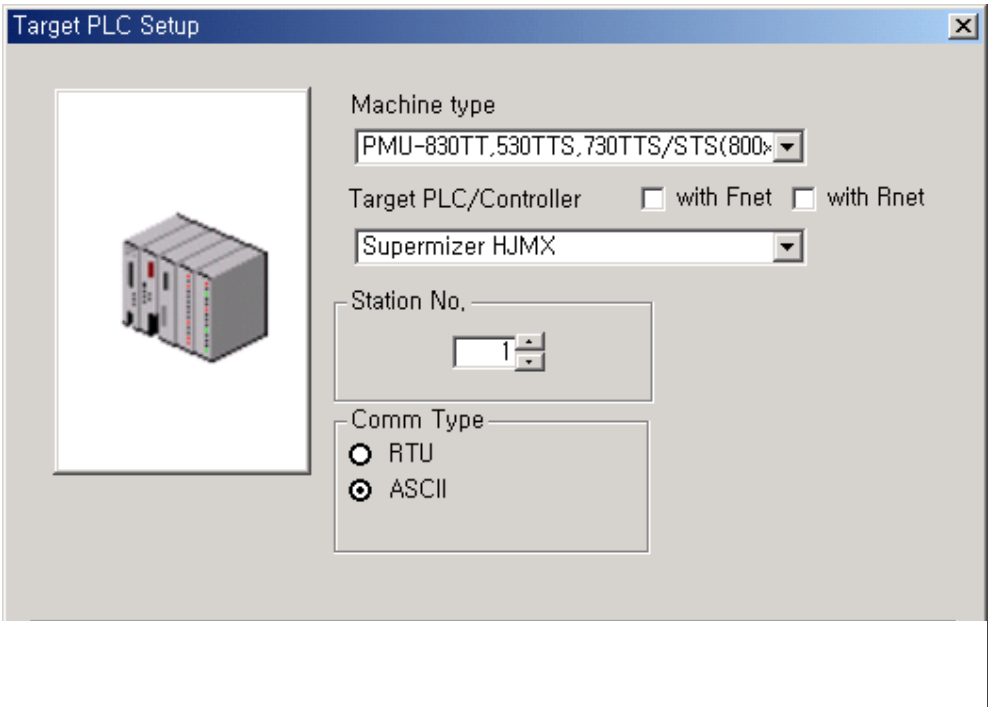
CD 162	0	1	2	3	4	5
Data Bit	8	8	8	8	8	8
Parity Bit	NONE	EVEN	ODD	NONE	EVEN	ODD
Stop Bit	1	1	1	1	1	1
Mode	ASCII	ASCII	ASCII	RTU	RTU	RTU

In order to set address for HJMX inverter, press △ or ▽ button after pressing the PROG button on the front panel of HJMX. Continuously, set data press △ or ▽ button after pressing the SET button on the front panel of HJMX.

4.5.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of “Supermizer HJMX” as shown figure.



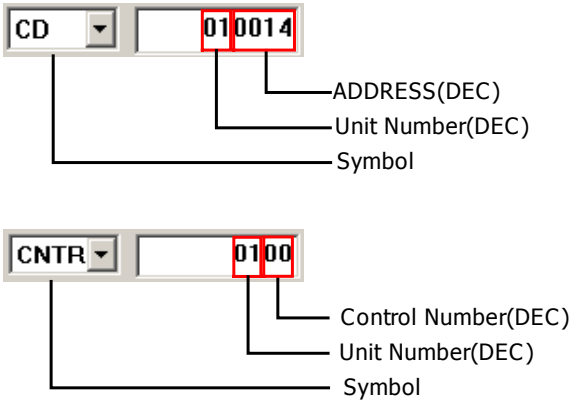
(2) Serial communication setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows:

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level : RS-485
- Station No. at Communication Diagnosis(0~31) : Same as controller’s setup

4.5.2.4 Address Setup

Address of the HJMX setup as shown figure.



4.5.3 Available Address List

Symbol	Bit Address	Word Address
CD	None	CD0000 ~ CD0250
CNTR	None	CNTR00 ~CNTR07

- Control Number of CNTR

Number	7	6	5	4	3	2	1	0
Command	jogr	jogf	jog	f/r	stop	Rev	for	Run

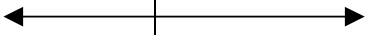
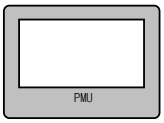
4.6 ROBOSTAR NewRo RCM

4.6.1 ROBOSTAR NewRo RCM Interface

This section describes the system configuration and interface between the ROBOSTAR NewRo RCM Series and PMU.

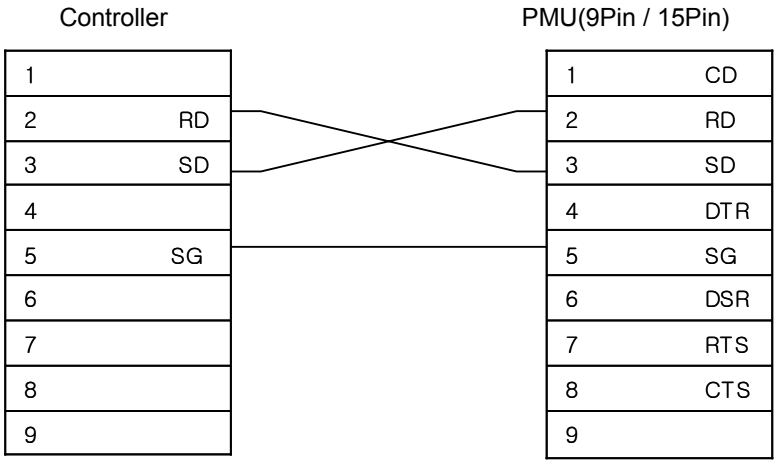
4.6.2 System Configuration

This figure shows system configuration to connect ROBOSTAR NewRo RCM Series to PMU.

Controller	Comm. Unit	Cable	PMU
			
ROBOSTAR NewRo RCM	None	Refer to connection diagram RS-232	All PMU

4.6.2.1 Cable Connection Diagram

(1) RS-232 connection diagram(ROBOSTAR NewRo RCM series ↔ PMU)



4.6.2.2 Communication setup of ROBOSTAR NewRo RCM

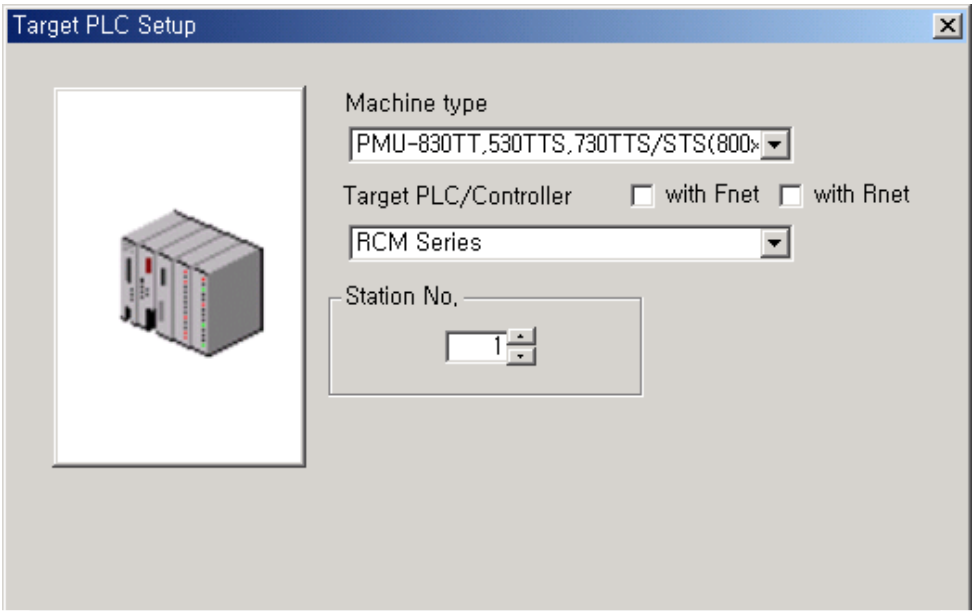
Communication parameters of ROBOSTAR NewRo RCM can be set as follows :

No.	Item	Contents
1	BAUD RATE	9600 BPS
2	DATA BIT	8 BIT
3	STOP BIT	1 BIT
4	PARITY	NONE
5	Signal Level	RS-232

4.6.2.3 PMU Setup

(1) PMU Editor Setup

Select Controller type of “RCM Series” as shown figure.



(2) Serial communication setup in PMU

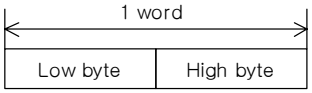
The recommended communication setup are as follows:

- Serial Baud Rate : Same as controller's setup
- Serial Data Bit : Same as controller's setup
- Serial Stop Bit : Same as controller's setup
- Serial Parity Bit : Same as controller's setup
- Serial Signal Level : RS-232
- Station No : Non-Used

4.6.3 Available Address List

Device	Bit address	Word address
INPUT	INP000 ~ INP415	INP0 ~ INP4[1)]
OUTPUT	OUT000 ~ OUT415	OUT0 ~ OUT4[2)]
INTERNAL BIT	M0500 ~ M1715	M05 ~ M17[3)]
ERROR	-	ERR 0[4)]
MESSAGE	-	MSG 0[5)]
SPEED	-	SPD 0[6)]
JOB	-	JOB 0[7)]
FUNCTION	-	FUN 0 ~ FUN 5[8)]
INTEGER	-	INT 000 ~ INT 255[9)]
POSITION X	-	POSX 0000 ~ POSX 1999[10)]
POSITION Y	-	POSY 0000 ~ POSY 1999[10)]
POSITION Z	-	POSZ 0000 ~ POSZ 1999[10)]
POSITION W	-	POSW 0000 ~ POSW 1999[10)]
MPG	-	MPG0 ~ MPG1[11)]
CURRENT LINE	-	CRL0[12)]
CURRENT POSITION	-	CRP0 ~ CRP1[13)]
PLUP	-	PLUP 0[14)]
FORWARD	-	FWD 0[15)]
EXCHANGE		EXCH[16)]
X AXIS VIEW		AXIS[17)]

Remarks 1) This device is a read only device to read status of input card. A word comprises of two bytes and High byte of a word is followed by Low byte as follows :



Remarks 2) This device is for status of output card and is able to be read and written. A word comprises of two bytes and High byte of a word is followed by Low byte such like input device of remarks 1

Remarks 3) This device is for status of internal relay and is able to be read and written.

Remarks 4) When error happens, the value of this device is set to non-zero value. When writing data to this device, error is reset irrelevant to data.

Remarks 5) This device displays error code. Message code is reset to zero in writing data.

Remarks 6) This device displays RPM value of motor. The unit of RPM is a percentage to be ranged from 1 to 100.

Remarks 7) Current operating JOB No.

Remarks 8) This device is write-only device. The function of this device is shown as above table..

Address	SET	RESET
FUN 0	Origin Start	Origin Stop
FUN 1	Servo ON	Servo OFF
FUN 2	Motor Power ON	Motor Power OFF
FUN 3	Run Mode : STEP	Run Mode : continuous
FUN 4	Program Start	Program Stop
FUN 5	Program Reset	
FUN 6	Emergency Stop	
FUN 7	Motion Stop	
FUN 8	System Reboot	

- The example of FUN device setup

User can use Touch tag to implement the function of FUN device such as ‘SET’ or ‘RESET’.

(1) Set function

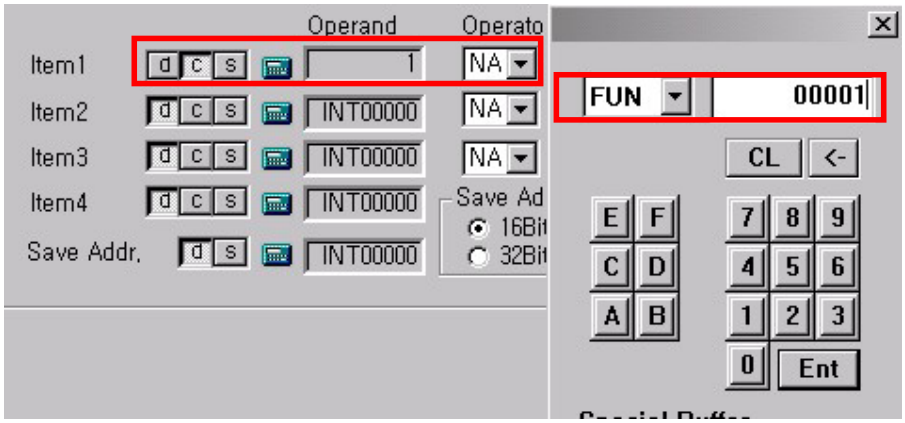
In order to implement set function using FUN device, select Touch tag => Operation => word operation. Item 1 of operation of touch tag is set to constant value 1 and Save address is set to FUN Device. Constant value 1 means “SET” function of FUN device.

(2) Reset function

Reset function of FUN device is same as set function except for constant value.

Item 1 of operation of touch tag is reset to constant value 0 and Save address is set to FUN Device. Constant value 1 means “RESET” function of FUN device.

The above figure shows the example to implement “Servo ON’ function using touch tag.



Remarks 9) The value of INT device is ranged from –32768 to 32767.

Remarks 10) This device displays position of axis of X,Y,Z,W. The range of X,Y,Z,W position is from –9999999.99 to 9999999.99. Position value have the fixed second decimal point.

Remarks 11) This device is to read and select MGP moving axis as well as moving distance of MGP input pulse.

MPG 0 : Read or select the MPG moving axis (data 1 : axis X, data 2 : axis Y, data 3 : axis Z, data 4 : axis W, data 9 : release)

MPG 1 : Read or select moving distance of MGP input pulse (Range of data : 0 ~ 100)

Remarks 12) Current operating line

Remarks 13) Current operating position.

Device	Function	Device	Function
CRP 0	Encoder Pulse axis X	CRP 10	Joint axis X
CRP 1	Encoder Pulse axis Y	CRP 11	Joint axis Y
CRP 2	Encoder Pulse axis Z	CRP 12	Joint axis Z
CRP 3	Encoder Pulse axis W	CRP 13	Joint axis W

Remarks 14) This device is write-only device to write PLUP position and have the range from 000 to 999.

Remarks 15) This device is write-only device to move the selected address.

Remarks 16) Write-only device to exchange between axis X and H for Desktop.

Remarks 17) Read-only device to display what the current axis is operating as a real axis X (Data 1 : axis X is operating as real axis X, data 4 : axis H is operating as real axis X)

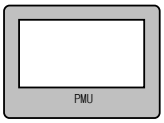
4.7 PMAC Series

4.7.1 PMAC Series Interface

This section describes the system configuration and interface between the PMAC Series and PMU.

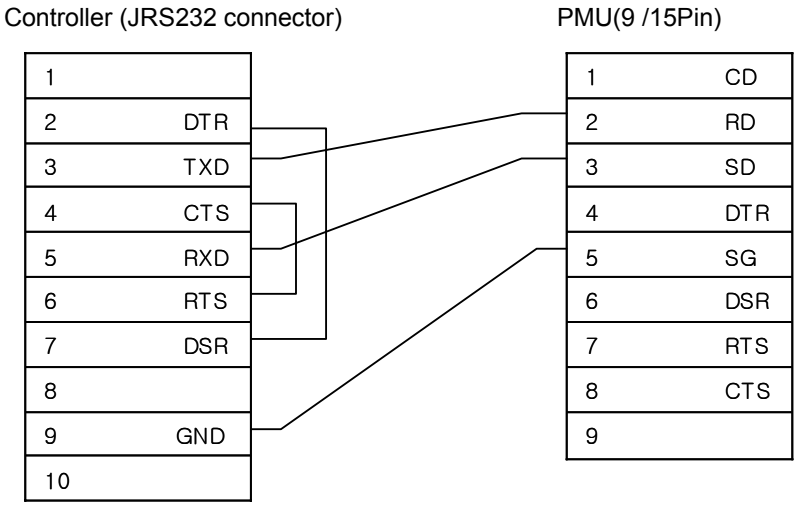
4.7.2 System Configuration

This figure shows system configuration to connect PMAC Series to PMU.

Controller	Comm. Unit	Cable	PMU
			
PMAC	RS232	Refer to connection diagram RS232	All PMU

4.7.2.1 Cable Connection Diagram

(1) RS-232 cable connection diagram(PMAC series ↔ PMU)



4.7.2.2 PMAC Series setup

Communication parameters of PMAC can be set using E-point Jumper on main board of PMAC as follows :

E44	E45	E46	E47	20MHz Flash CPU	Standard CPU 40MHz	60MHz Flash CPU
ON	ON	ON	OFF	-(1)	-(1)	9600
OFF	ON	ON	OFF	-(1)	9600	-(1)
ON	OFF	ON	OFF	-(1)	-(1)	19200
OFF	OFF	ON	OFF	9600	19200	-(1)
ON	ON	OFF	OFF	-(1)	-(1)	38400
OFF	ON	OFF	OFF	19200	38400	57600
ON	OFF	OFF	OFF	-(1)	-(1)	76800
OFF	OFF	OFF	OFF	38400	76800	115200

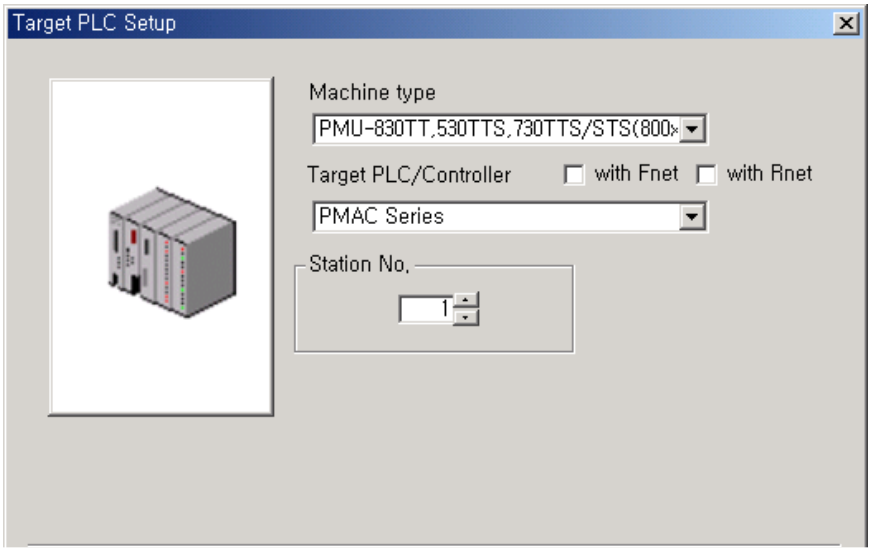
Remarks 1) Baud Rate in the blank column of the above table can not be available for PMU

E49	Serial Communication Parity Control
	Jump pin 1 to 2 for NO serial parity; remove jumper for ODD serial parity

4.7.2.3 PMU Setup

(1) PMU Editor Setup

Select Controller type of “PMAC Series” as shown figure.



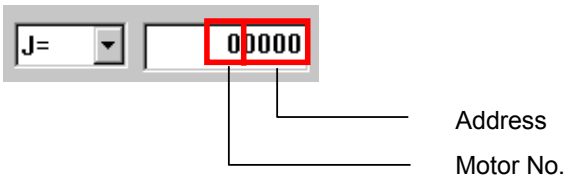
(2) Serial communication setup in PMU

The recommended communication setup are as follows:

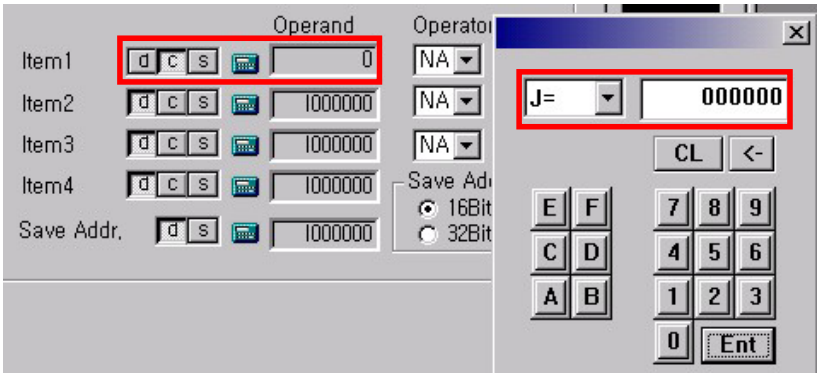
- Serial Baud Rate : 38400 bps
- Serial Data Bit : 8 bit
- Serial Stop Bit : 1 bit
- Serial Parity Bit : none
- Serial Signal Level : RS-232
- Station No : 0

4.7.2.4 Addressing method of PMU for UX100/NX/PX

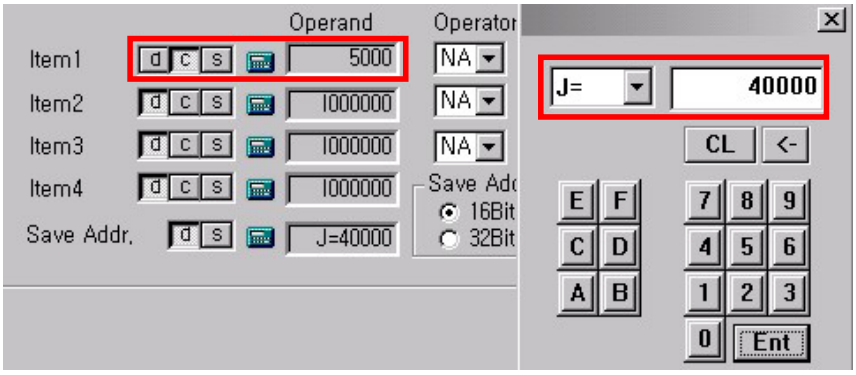
The method to address of PMU for PMAC can be setup as follows :



For example, the above figure shows addressing method to JOG motor to 0 position.



The above figure shows the example to JOG #4 motor with 5000 count



4.7.3 Available Address List

Device	Function	Address	R/W
I	I variable	0000 ~ 9999	R/W
M	M variable	0000 ~ 9999	R/W
P	P variable	0000 ~ 9999	R/W
Q	Q variable	0000 ~ 9999	R/W
JOG*		0001 ~ 0004	W
J:	Jog motor specified distance from current commanded position	-	W
J=	jog motor to specified position	-	W
J^	jog motor specified distance from current actual position	-	W
K	kill output for motor	-	W
POS	report position of motor	-	R
RUN	Run current program	-	W
HLT	Halt program	-	W
VEL	report velocity of motor	-	R
FER	report following error of motor	-	R

Remarks *) (1) JOG 0001 : J+ (jog motor indefinitely in positive direction)
(2) JOG 0002 : J- (jog motor indefinitely in negative direction)
(3) JOG 0003 : J/ (stop jogging motor; also restore to position control)
(4) JOG 0004 : J= (jog motor to last pre-jog or pre-handwheel position)

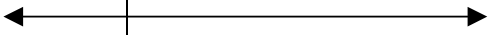
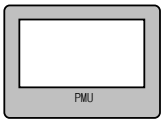
4.8 GIDDINGS & LEWIS MMC

4.8.1 GIDDINGS & LEWIS MMC Interface

The following section describes the system configuration and interface between GIDDINGS & LEWIS MMC and PMU by serial RS-232.

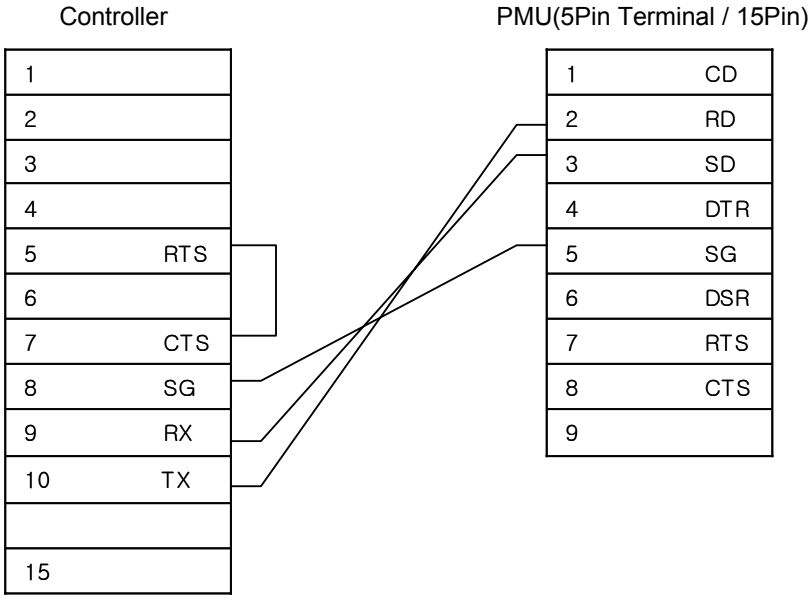
4.8.2 System Configuration

This figure shows system configuration to connect GIDDINGS & LEWIS MMC to PMU.

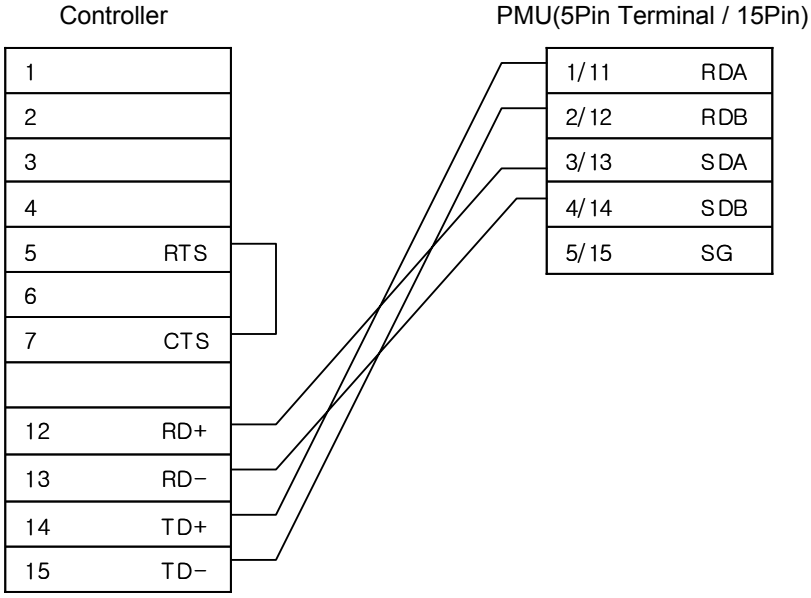
Controller	Comm. Unit	Cable	PMU
			
MMC	None	Refer to connection diagram (RS-232 / RS-422)	All PMU

4.8.2.1 Cable Connection Diagram

(1) RS-232 cable diagram(MMC ↔ PMU)



(2) RS-422 cable diagram(MMC ↔ PMU)



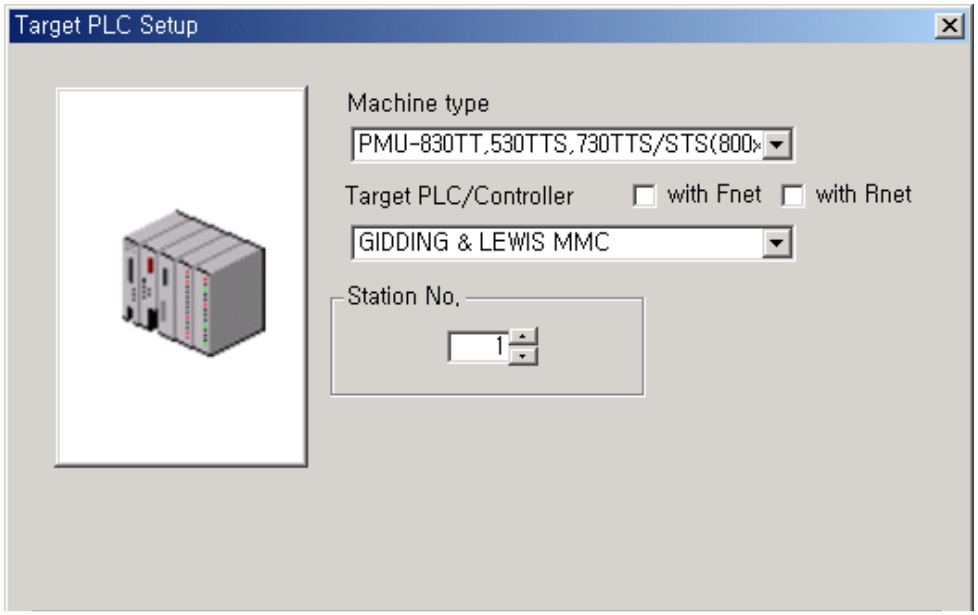
4.8.2.2 GIDDINGS & LEWIS MMC Setup

MMC Setup	
Baud Rate	19200 bps
Data Bit	8 bit
Stop Bit	1 bit
Parity Bit	NONE

4.8.2.3 PMU Setup

(1) PMU Editor setup

Select Controller type of “GIDDING & LEWIS MMC” as shown figure.



(2) Serial communication setup in PMU

Communication setup in ‘Comm. Setup’ Menu are as follows :

- Serial Baud Rate : Same as controller’s setup
- Serial Data Bit : Same as controller’s setup
- Serial Stop Bit : Same as controller’s setup
- Serial Parity Bit : Same as controller’s setup
- Serial Signal Level : Same as controller’s setup
- Station No. at Communication Diagnosis(0~31) : Non-used

4.8.3 Available Address List

Data TYPE	DEVICE	LABEL	Data Size	Remarks
00	BOOL	TYPE_BOOL	1	Bit
01	BYTE	TYPE_BYTE	1	
02	WRD	TYPE_WORD	2	
03	DWRD	TYPE_DWORD	4	
04	LWRD	TYPE_LWORD	8	
05	ISIN	TYPE_ISINT	1	
06	USIN	TYPE_USINT	2	
07	UDIN	TYPE_UDINT	4	
08	ULIN	TYPE_ULINT	8	
09	SINT	TYPE_SINT	1	
0A	INT	TYPE_INT	2	
0B	DINT	TYPE_DINT	4	
0C	LINT	TYPE_LINT	8	
0D	REAL	TYPE_REAL	4	
0E	LREL	TYPE_LREAL	8	
0F	STR	TYPE_STRING	Variable	
10	DATE	TYPE_DATE	2	
11	DTIM	TYPE_DATETIME	4	
12	TDAY	TYPE_TIMEOFDAY	4	
13	TDUR	TYPE_TIMEDURA	4	
14	CUS1	TYPE_CUST1	User-defined	
15	CUS2	TYPE_CUST2	User-defined	
16	CUS3	TYPE_CUST3	User-defined	
17	CUS4	TYPE_CUST4	User-defined	
18	CUS5	TYPE_CUST5	User-defined	
19	CUS6	TYPE_CUST6	User-defined	
1A	CUS7	TYPE_CUST7	User-defined	
1B	CUS8	TYPE_CUST8	User-defined	

5. N:1 Communication (Multi-Link)

This section describes multi-link interface between PMU and controller, and explains how to setup communication parameters for multi-link communication.

5.1 Basic of N:1 Communication (Multi-Link)

In multi-link communication, multiple PMUs as a master can be connected to a single controller as a slave using RS-485.

In order to prevent collision of communication among PMUs, PMU to have a token has authority to communicate with controller but PMU which don't have a token can not communicate with controller. After PMU to have a token read or write data of controller, PMU passes a token the next PMU to be sequentially connected to it's own.

Caution

N:1 communication interface (Multi-Link) is supported only in Version 2.3 of O.S firmware and software (Editor). If user want to use N:1 communication interface, user has to upgrade the existing O.S firmware and software into new firmware and software, Version 2.3 or above.

5.2 Characteristics of N:1 (Multi-Link)

When using multi-link communication, there are several advantage such as following items.

(1) Multiple PMUs can be directly connected to a controller without any optional module.

(2) If a controller can support RS-485 communication, it is possible to communicate with multiple PMUs.

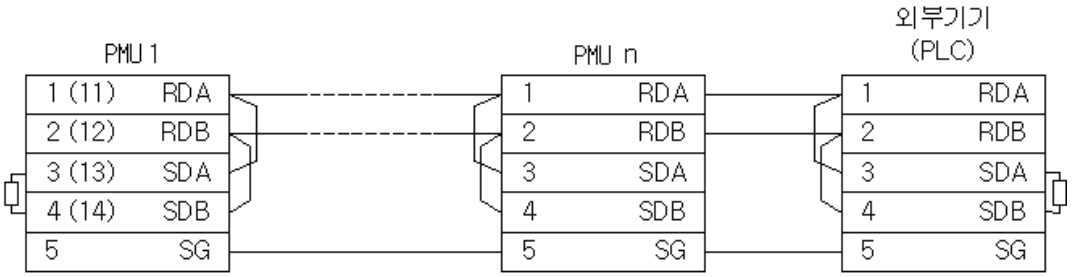
(3) There is not needed extra software as well as the modification of existing project file in order to using multi-link communication.

(4) All type of PMU can support multi-link communication.

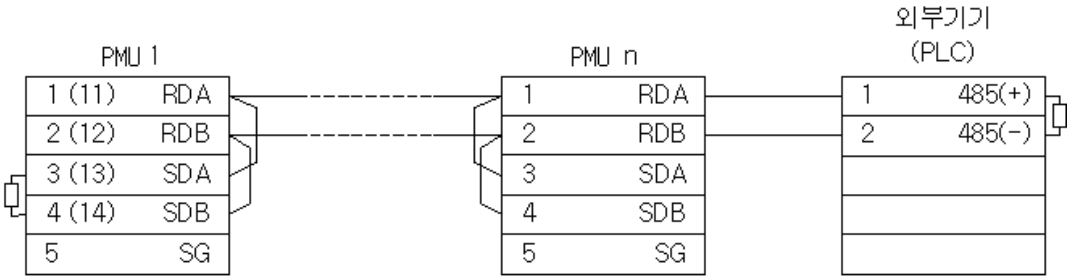
5.3 Connection diagram of multi-link communication

Multi-link communication can be used only for RS-485 serial communication and cable connection diagram is as follows.

Case of 4 wire for controller.

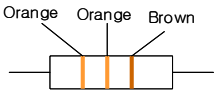


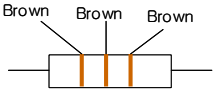
Case of 2 wire for controller



Caution

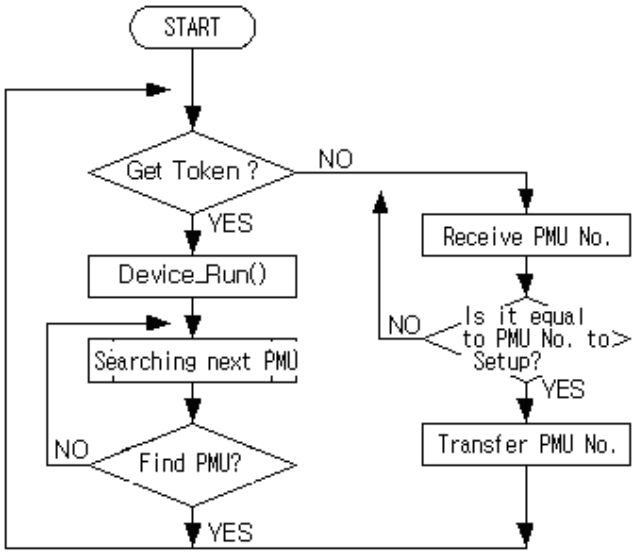
It is recommended to use signal ground (SG) and terminal resistor for more stable communication. Recommended terminal resistor are as follows.

330Ω 

110Ω 

5.4 Operation of N : 1 communication(Multi-Link)

5.4.1 Flow chart of multi-link operation



5.4.2 Operating procedure of Multi-Link communication

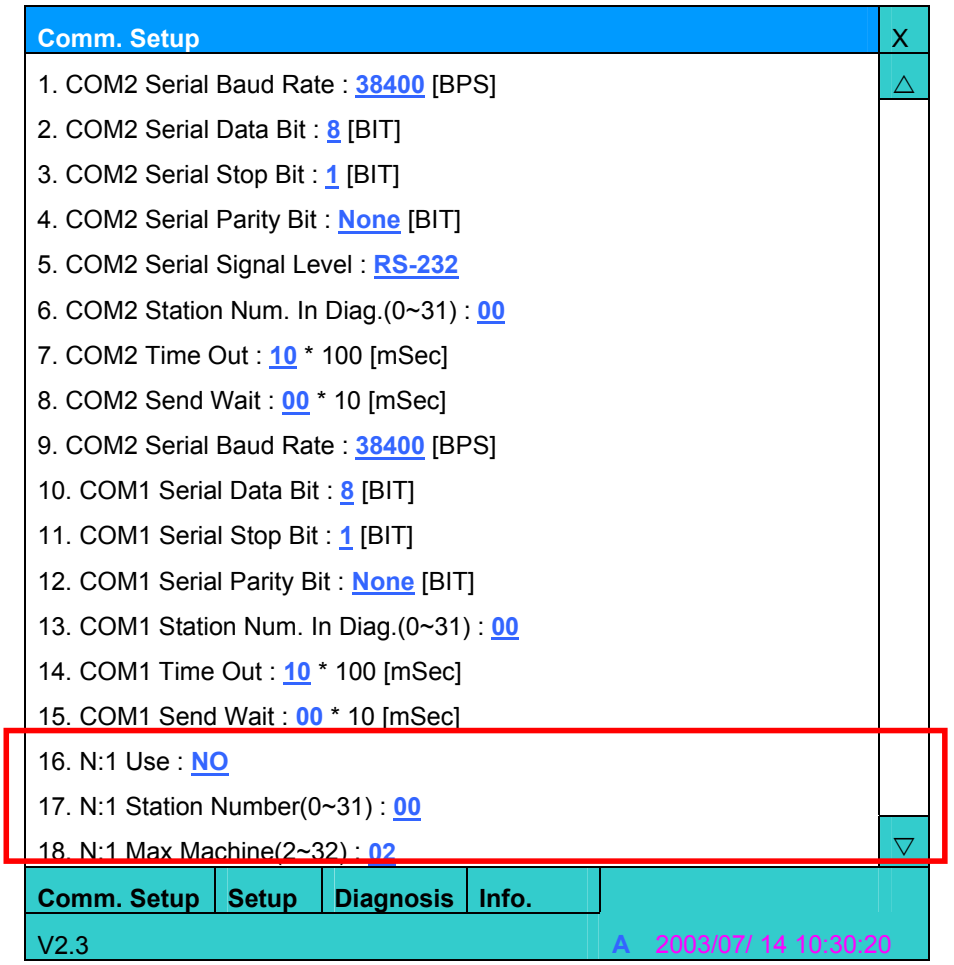
1. Initially, All PMU have not a token at the first time but only one PMU get a token among other PMUs after pre-defined periods. Because each PMU has a different time interval to get a token according to it's station number, the only one PMU eventually has a token even though multiple PMU turn on at the same time.

2. PMU to get a token starts to communicate with a controller using RS-485. During a run scan time of PMU, PMU to have a token transfers or receives data from a controller. After processing data from a controller, PMU, which got a token, search the next PMU to be connected with itself. If PMU, which got a token, find the next PMU, PMU passes a token to the next PMU and confirms whether the next PMU receive a token. PMU which have passed a token to the next PMU transit It's mode to waiting mode and PMU which have got a token from the previous PMU is activated and starts to communicate with a controller.
3. In the 'Waiting Mode', PMU takes no account data from PMU and controller, and is waiting for token from the previous PMU.

5.5 Setup communication parameters for Multi-Link

Communication parameters setup in PMU

Communication parameters for Multi-Link can be setup at “Comm. Setup” of main menu on the PMU machine. Communication parameters in “Comm. Setup” menu are as following figure.


Comm. Setup
X
1. COM2 Serial Baud Rate : 38400 [BPS]
2. COM2 Serial Data Bit : 8 [BIT]
3. COM2 Serial Stop Bit : 1 [BIT]
4. COM2 Serial Parity Bit : None [BIT]
5. COM2 Serial Signal Level : RS-232
6. COM2 Station Num. In Diag.(0~31) : 00
7. COM2 Time Out : 10 * 100 [mSec]
8. COM2 Send Wait : 00 * 10 [mSec]
9. COM2 Serial Baud Rate : 38400 [BPS]
10. COM1 Serial Data Bit : 8 [BIT]
11. COM1 Serial Stop Bit : 1 [BIT]
12. COM1 Serial Parity Bit : None [BIT]
13. COM1 Station Num. In Diag.(0~31) : 00
14. COM1 Time Out : 10 * 100 [mSec]
15. COM1 Send Wait : 00 * 10 [mSec]
16. N:1 Use : NO
17. N:1 Station Number(0~31) : 00
18. N:1 Max Machine(2~32) : 02
Comm. Setup
Setup
Diagnosis
Info.
V2.3
A 2003/07/ 14 10:30:20

In N:1 communication (Multi-Link), communication setup of COM1 port is not available but COM2 port because RS-485 signal level is unavailable in COM1 port. When using N:1 communication (Multi-Link), all communication parameters is same as that of 1:1 communication except for items 16, 17, 18 and COM2 signal serial level is fixed to RS-485(2).
Items of N:1 communication parameters is item 16,17 and 18 in “Comm. Setup” menu as following.

(1) N : 1 Use

This is the item to determine whether N:1 communication will be used or not. Default value is “No’ but if user wants to make use of N:1 communication, this item should be setup to “YES”.

(2) N : 1 Station Number(0~31)

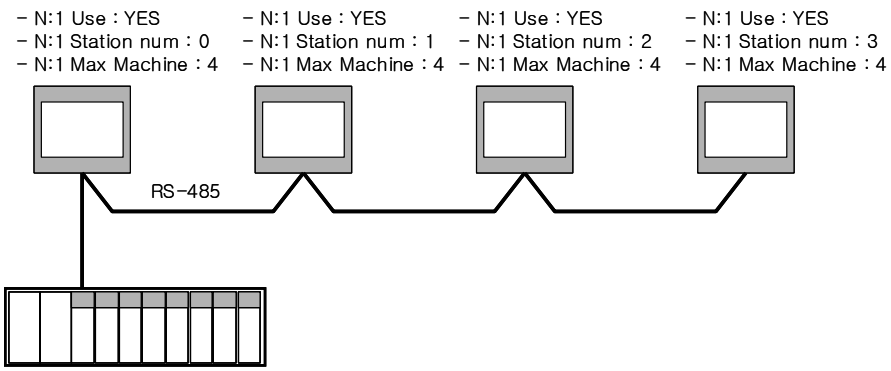
This item is available only when item of “N:1 Use” is setup to “YES”. N:1 station number means station number of PMU itself. The station number of the first PMU has to be set to ‘0’ and the other PMUs has to be respectively set to sequential number such as ‘1’, ‘2’, ‘3’ etc.

(3) N : 1 Max Machine(2~32)

This item is also available only when items of “N:1 Use” is setup to “YES”. “N:1 Max Machine” means total number of PMUs to be connected in N:1 communication (Multi-Link). Because maximum 32 PMUs can be connected in Mullti-link, the range of this item is from 1 to 32.

Example of communication parameters setup for Multi-Link

The example of communication parameters for Multi-link, in which total 4 PMUs is connected, is as follows :


- N:1 Use : YES
- N:1 Station num : 0
- N:1 Max Machine : 4
- N:1 Use : YES
- N:1 Station num : 1
- N:1 Max Machine : 4
- N:1 Use : YES
- N:1 Station num : 2
- N:1 Max Machine : 4
- N:1 Use : YES
- N:1 Station num : 3
- N:1 Max Machine : 4
RS-485

Caution

The station number of a first PMU (N:1 Station Number(0~31)) should be set to number ‘0’ and the station number of the other PMUs should be setup to the next number such as 1, 2,3…. If there is no PMU with station number ‘0’, it could make communication speed slow

Total number of PMUs to be connected in Multi-Link (N:1 Max Machine) has to be setup to same number for all PMUs. If the number of ‘N:1 Max Machine’ is different among PMUs, it can make some troubles in multi-link

6. 2 Way Communication using COM 1 and COM 2 port

6.1 General

This section is to describe how to use 2 way communication using COM1, 2 serial port.

2 way communication is supported only in Version 2.3 of O.S firmware and software (Editor). If user want to use 2 way communication, user has to upgrade the existing O.S firmware and software into new firmware and software, Version 2.3 or above.

6.2 Serial Port of PMU

PMU machine provides two serial ports, COM 1 and COM 2, to communicate to personal computer and PLC / controller respectively. COM 2 serial port can support RS-232 / RS422 / RS-485 serial interface and is used for communication to PLC and controller.

COM 1 serial port can support only RS-232 serial interface and originally, is used for downloading a project file to be made by “Editor s/w tool” on personal computer. But COM 1 serial port can communicate to PLC / controller as well as personal computer with connecting another PLC or controller using COM 2 serial port. Because COM 1 serial port can support only RS-232 serial interface, user can connect PLC or controller which have RS-232 serial interface.

Because COM 1 serial port can support only RS-232 serial interface, PLC or controller which have only RS422 / RS485 serial interface can not .be connected to COM 1 port of PMU.

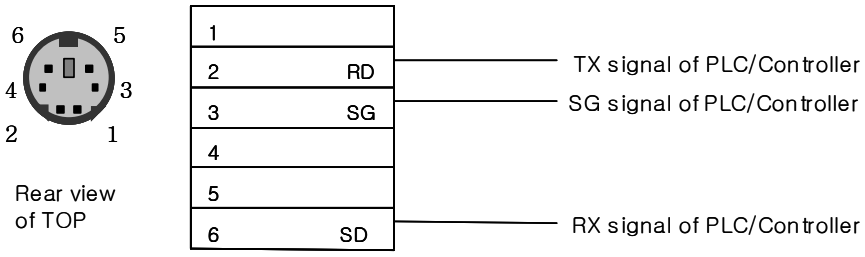
6.3 Cable connection for 2 way communication

6.3.1 Cable connection to PLC or controller using COM 2 port

Cable connection to PLC or controller using COM 2 port is same as cable connection diagram as described in chapter 2 in this communication manual.

6.3.2 Cable connection to PLC or controller using COM 1 port

Cable connection diagram for PLC or controller using COM 1 port is as following :



The method to setup communication parameters for COM 1 port is same as that of COM 2 port.

6.4 Connectable PLC list using COM 1 port

(Connectable : ●, Non-connectable : X)

PLC TYPE	COM 2 port	COM 1 port
AB SLC500 / PLC5(Loader)	●	●
ABB INVERTER	●	X
AND Weighing Indicator	●	●
CIMON (Link)	●	●
CIMON (Loader)	●	X
COMFILE TYNY	●	X
DASA IMS-J Motion Controller	●	X
DDC (1:1)	●	●
Delta DVP-ES	●	●
DongYang MAXCOM	●	X
ExtDDC	●	X
FARA-N (Link)	●	X
FARA-N (Loader)	●	X
Fuji Micrex-F	●	X
GE-FANUC 90-30	●	X
G-SERIES GM (Link)	●	●
G-SERIES GM 10s, 60H (Loader)	●	●
G-SERIES GM 80,200,100 (Loader)	●	●

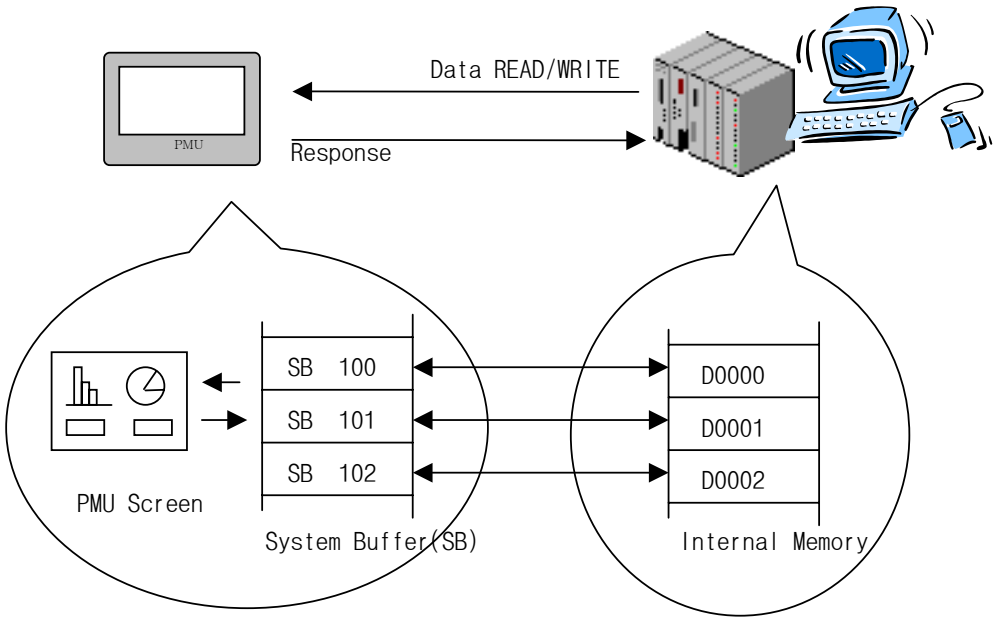
PLC TYPE	COM 2 port	COM 1 port
IMO INVERTER	●	X
KOYO Direct Net	●	X
LG INVERTER	●	X
K-Series (Link)	●	●
K-Series 10S, 100S (Loader)	●	X
K-Series 200,300,1000S (Loader)	●	●
Melsec AnN, AnU, AnS, AnA (Loader)	●	X
Melsec C24/UC24 (Link)	●	●
Melsec FX (Link)	●	●
Melsec FX (Loader)	●	X
Melsec Q (Link)	●	●
Melsec Q (Loader)	●	X
Metronix AnyPack (1:N)	●	X
Metronix AnyPack(1:1)	●	●
MODBUS	●	●
OMRON CS1/C (Loader)	●	●
POSCON PHLDA	●	X
ROBOSTAR NewRo RCM	●	X
ROBOSTAR NewRo RCS6000	●	X
SAIA PCD	●	X
Siemens S5 3964 (Link)	●	●
Siemens S7 MPI	●	X
Siemens S7 PPI	●	X
YASKAWA MP920	●	●
YOKOKAWA FA-M3	●	X
SLAVE protocol	●	●

7. Serial Slave Communication Protocol

This section is to describe the protocol for interfacing PMU with host PC or external controllers that PMU do not support specified protocol.

For SLAVE COMMUNICATION, PMU must be set to special protocol mode that PMU support. (In this case, host PC or external controller must provide the program for READ/WRITE data from/to PMU.)

In case of SLAVE setting, PMU responses when host PC or external controller request data from PMU or write to PMU. At that time, host PC or external controllers have to READ/WRITE according to predefined PMU SLAVE protocol.



7.1 SLAVE Protocol Description

This section is to describe protocol that you have to program in host PC or external controller .Protocol consists of 2 kinds and 4 commands.

Kind	Command	Contents	Direction
READ Protocol	READ Command	Read data from PMU System Buffer Area.	PMU ← Controller or PC
	READ Response (ACK) Command	Read Command Response in order that PMU send data to Controller or PC.	PMU → Controller or PC
Write Protocol	Write Command	Write data to PMU System Buffer.	PMU ← Controller or PC
	Write Response (ACK) Command	Write Command Response that PMU send sign of “WRITE Command Complete” to Controller or PC.	PMU → Controller or PC

7.1.1 READ Command

Contents of READ command are as follows.

Code	Size (byte)	Example	Hexa	REF.
ENQ	1	ENQ	05H	Start Code
Station Number	2	01	3031H	Station Num. of PMU
Command(R)	1	R	52H	
Start Address In System Buf.	4	0100	3031H 3030H	System Buf. Address of PMU
Number of Word	2	10	3130H	Number of Word(HEX)
EOT	1	EOT	04H	Complete Code
BCC	2	BCC	4439H	SUM Value of Station NUM. to Complete Code

Above Example require PMU to transmit 10 data (word) in PMU system buffer address 100 to system buffer address109.

7.1.2 Response Command(ACK) for READ

This example shows data frame to response enquire from master. PMU send data of system buffer after receive READ command normally and check normal BCC.

Code	Size (byte)	Example	Hexa	REF>
ACK	1	ACK	06H	Start Code
Station Num.	2	01	3031H	Station Num. of PMU
Command(R)	1	R	52H	
Data	64	1234H 4567H : : FFFFH	3132H 3334H 3435H 3637H : : 4646H 4646H	Data of System Buf. Size is variable according to number of data.
EOT	1	EOT	04H	Complete Code
BCC	2	BCC	4237H	SUM Value of Station NUM. to Complete Code

Above example means that SB100 is 1234H,SB101 is 4567H,…,and SB109 is FFFFH.

7.1.3 Write Command

WRITE commands are as follows.

Code	Size (byte)	Example	Hexa	REF.
ENQ	1	ENQ	05H	Start Code
Station Num.	2	01	3031H	Station Num. of PMU
Command(R)	1	W	57H	
Start Address of System Buffer(SB)	4	0100	3031H 3030H	System Buf. Address of PMU
Num. of Word	2	01	3031H	Num. of Word(HEX)
Data	4	1234H	3132H 3334H	Variable according to Num. of Word
EOT	1	EOT	04H	Complete Code
BCC	2	BCC	4138H	SUM Value of Station NUM. to Complete Code

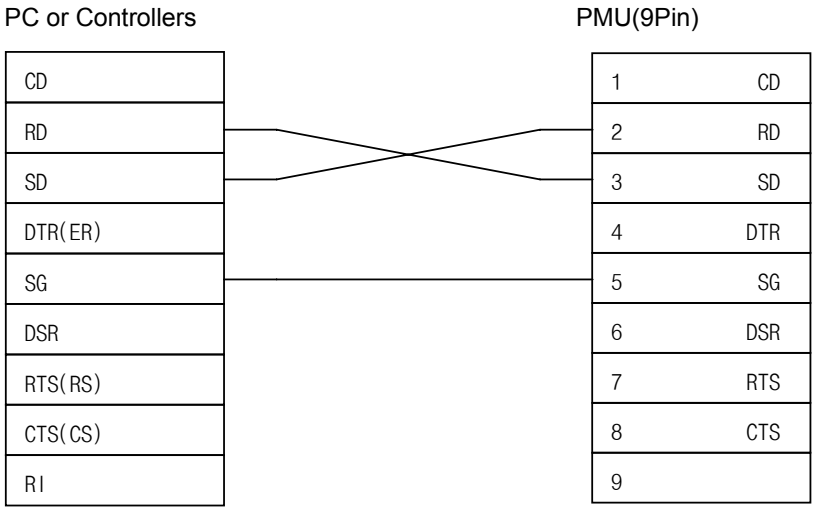
7.1.4 Response Command(ACK) for WRITE

PMU transmits Response Command(ACK) for WRITE to PC or controllers if receive WRITE command normally and write data to System Buffer normally.

Code	Size(byte)	Example	Hexa	REF
ACK	1	ACK	06H	Start Code
Station Num.	2	01	3031H	Station Num. of PMU
Command(R)	1	W	57H	
EOT	1	EOT	04H	Complete Code
BCC	2	BCC	4243H	SUM Value of Station NUM. to Complete Code

7.1.5 Cable Diagram

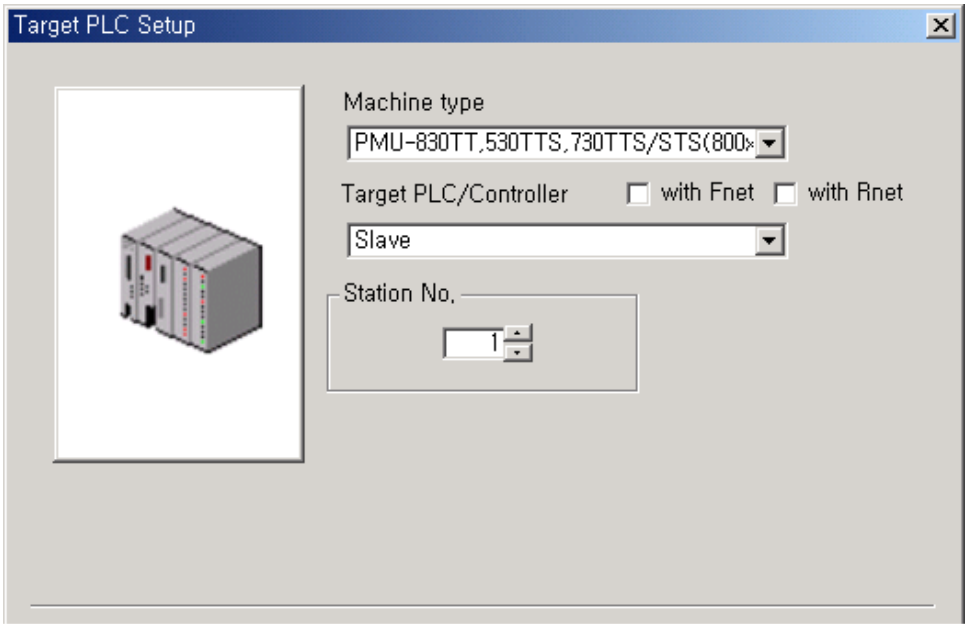
If host computer is IBM compatible, connection diagram of PC's RS-232C Port COM1 and PMU RS-232C Port are as follows. Be cautious there are some differences according to Signal Spec. of PC RS-232C Port.



7.1.6 PMU Setup

(1) PMU Editor Setup

Select "Slave" in PC or Controllers according to your application.

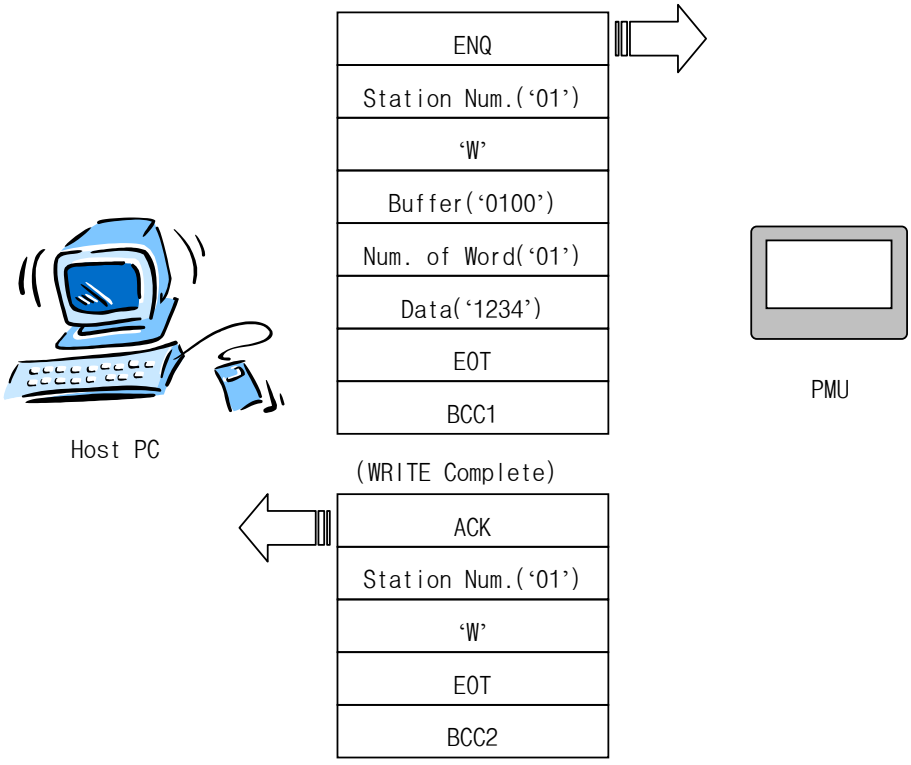


(2) PMU Setup

There is no limit in PMU setting but external controller(including PC)'s program has to be programmed as communication parameter of PMU.

7.1.7 Communication Programming Example

This is BASIC Program example to write data to PMU assuming external controller is host PC.



BCC1 = Station Num.('01') + Command('W') + Buffer Address('0100') + Num. of Word('01') + Data('1234') + EOT

BCC2 = Station Num.('01') + Command('W') + EOT

If BCC SUM value is more than 3 digits, convert right 2 digits to ASCII code and transmit or receive .2 digit BCC.

This is EXAMPLE programmed by 'BASIC' in host PC.

(1) EXAMPLE :Program Execution Screen

```
< WORD WRITE TEST PROGRAM >

     < Write Address ? >

     < Write Number  ? >

     < Write Data    ? >


    < Display Initial (R) / Quit (Q) > Select ?
```

```
< WORD WRITE TEST PROGRAM >

     < Write Address ? >    0100

     < Write Number  ? >    01

     < Write Data    ? >    1234


    < Display Initial (R) / Quit (Q) > Select ?
```

(2) EXAMPLE : Programmed by BASIC

```
DEFINE A-Z
DECLARE SUB BOX()
‘=====================================================
‘ COMMUNICATION TEST PROGRAM (WORD DATA WRITE)
‘=====================================================

‘RS-232C INITIAL ROUTINE ==================================
‘   PORT     -> COM1
‘   BPS      -> 19200
‘   PARITY   -> NONE
‘   DATA     -> 8BIT
‘   STOP     -> 1BIT
   OPEN “COM1,19200,N,8,1,CS,DS” FOR RANDOM AS #1

‘SCREEN DISPLAY ROUTINE ===================================
START:

   BOX

   LOCATE 4,10: PRINT “< WORD WRITE TEST PROGRAM >”
   LOCATE 23,20: PRINT “< Display Initial (R) / Quit (Q) > Select ? >      “
   LOCATE 7,15: PRINT “< Write Address ? >          “
   LOCATE 9,15: PRINT “< Write Number   ? >         “
   LOCATE 11,15: PRINT ”< Write Data      ? >          “

   LOCATE 7,37: INPUT “”, ADDRESS$
   LOCATE 9,37: INPUT “”,NUMBER$
   LOCATE 11,37: INPUT “”,DATA$

‘BCC CHECK ROUTINE ====================================
   DT$=”01” +   “W” + ADDRESS$ +   NUMBER$ + DATA$
   BCC=0
   LE=LEN(DT$)
```

```
   FOR I = 1 TO LE
      BC$=MID$(DT$,I,1)
      BC=ASC(BC$)
      BCC=BCC+BC
   NEXT I
   BCC=BCC + ASC(CHR$(4))
   HE$=HEX$(BCC)
   BCC1$=RIGHT$(HE$,2)

‘COMPUTER TO DATA SEND PROCESS ====================
   SEND$ = CHR$(5) + “01” + “W” + ADDRESS$ + NUMBER$ + DATA$ + CHR$(4)
+ BCC1$
   PRINT #1,SEND$;
   LOCATE 14,20: PRINT “[PC -> TOUCH SEN DATA] : “;SEND$
‘RECEIVED DATA INPUT PROCESS
   REACK$ = INPUT$(7,#1)
   LOCATE 16,20: PRINT “[TOUCH -> PC RCV DATA] : “.REACK$

‘ASK PROCESS REPEAT ================================
MENU :
   LOCATE 23,64 : INPUT “ ”, REV$
   SELECT CASE REV$
            CASE “R”,”r”
                  GOTO START1
            CASE “Q”,”q”
                  GOTO PROGEND
            CASE ELSE
   END SELECT

PROGEND:
   CLOSE #1
   CLS
   END

‘SUBROUTINE BOX ====================================
SUB BOX
```

```
  CLS
  LOCATE 2,1
  PRINT SPC(4); CHR$(201) ; STRING$(70,205); CHR$(187)
  FOR COUNT%=1 TO 20
    PRINT SPC(4);CHR$(186); STRING$(70); CHR$(186)
  NEXT COUNT%
  PRINT SPC(4); CHR$(200); STRINT$(70,205); CHR$(188)
END SUB
```

7.2 SLAVE Extended 2

7.2.1 METHODS OF COMMUNICATION

7.2.1.1 List of Commands

(1) Commands from the host

Item		Command		Processing	Total data size That can be Processed During one Communication session	Direction of communication
		System	ASCLL code			
Batch reading	In word	R	52H	Data is continuously read on a table basis.	1000 words	From Host to PMU
BatcH writing	In word	W	57H	Data is continuously written on a table basis.	1000 words	From Host to PMU

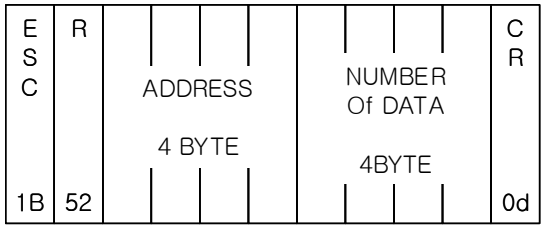
(2) Commands and responses from the PMU

Item		Command		Processing	Total data Size that can be processed during one communication session	Direction of communication
		System	ASCLL code			
Normal Response	To a Read command	A	41H	Data is Continuously read On a table basis.	Command specified Amount of data	From Host to PMU

7.2.2 Memory Table Batch Reading(in word)

(1) Data request frame by Host

Data request frame of host to read data in system buffer of PMU are as follows :



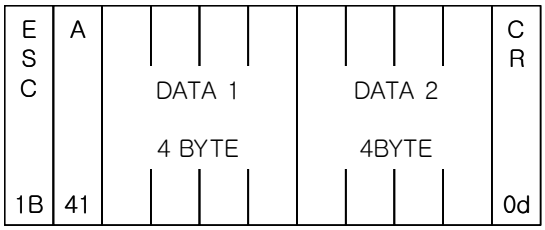
ESC : Start Code

R : Read Command

CR : Termination Code

(2) Response frame by Slave (PMU)

Response frame of slave for data request are as follows :



ESC : Start Code

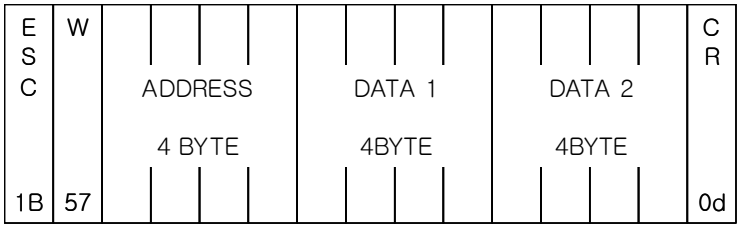
A : Response Command

CR : Termination Code

7.2.2.1 Memory Table Batch Writing(in word)

(1) Write frame by host

Data writing frame of host to write data to system buffer of PMU are as follows :



ESC : Start Code

W : Write Command

CR : Termination Code

7.2.2.2 The example of Memory Table Batch Reading(in word)

This is an example of a request to read system buffer 100 ~ 101 from PMU

ESC	R	0	0	6	4	0	0	0	2	CR
1B	52	30	30	36	34	30	30	30	32	0d

The above figure is an example of a response to the request.

ESC	A	1	2	3	4	A	B	C	D	CR
1B	41	31	32	33	34	41	42	43	44	0d

Data of system buffer 100 is shown as the value of 1234 hex and data of system buffer 101 is ABCD hex.

7.2.2.3 The example of Memory Table Batch Writing(in word)

This is an example of a request to write system buffer 200 and 201 to 3412 hex and CDAB hex respectively in PMU

ESC	W	0	0	C	8	3	4	1	2	C	D	A	B	CR
1B	57	30	30	43	38	33	34	31	32	43	44	41	42	0d

7.2.2.4 Data Transmission from the PMU to the Host by Switch Entry etc.

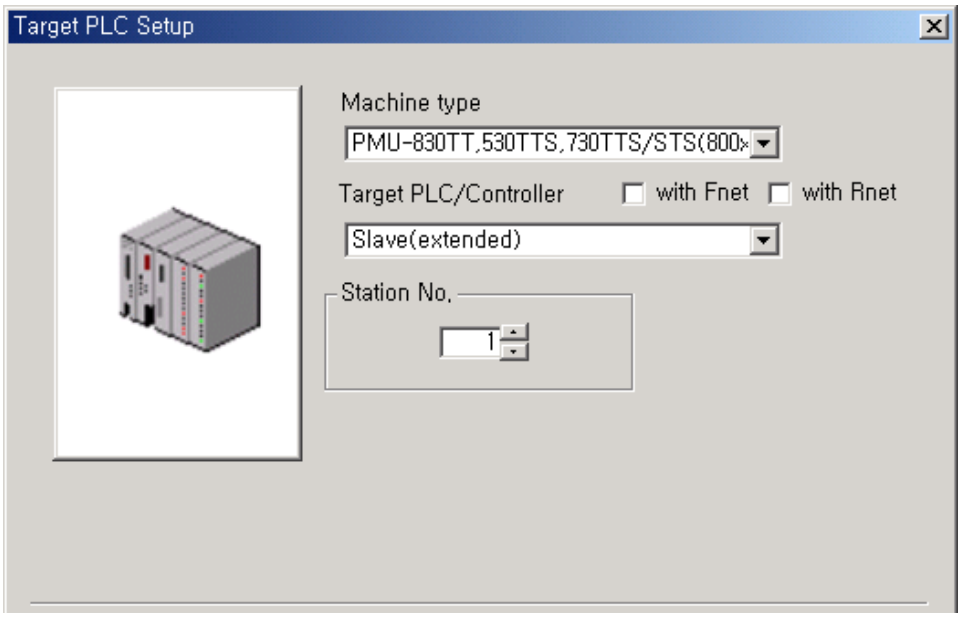
Interrupt output : When any data is written to system buffer 13, low byte (8 bit) is transferred to host as an interrupt code.

Example) Decimal data 124 is entered into system buffer 13 of PMU, low byte, 0x7C, is transferred to host as shown above figure.

7.2.2.5 PMU Setup

(1) PMU Editor Setup

Select “Slave(extended-2)” in PC or Controllers according to your application.



(2) PMU Setup

There is no limit in PMU setting but external controller(including PC)’s program has to be programmed as communication parameter of PMU.

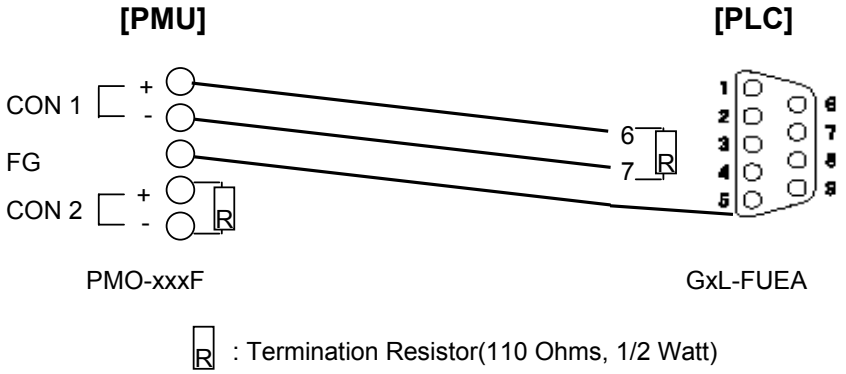
8. IMO Dedicated Communication Protocol

8.1 Fnet protocol description

The Fnet is IMO's dedicated fieldbus communication for IMO PLC(G-SERIES GM, K-SERIES), Inverter and HMI devices.

In order to use this communication, the High Speed Communication parameters should be set up in the PLC side.

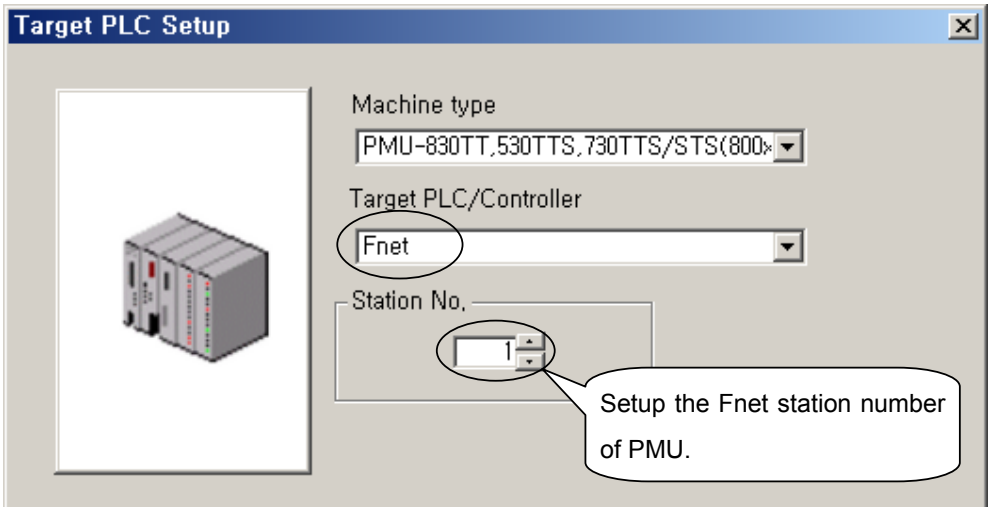
8.1.1 Cable connection



R : Termination Resistor(110 Ohms, 1/2 Watt)

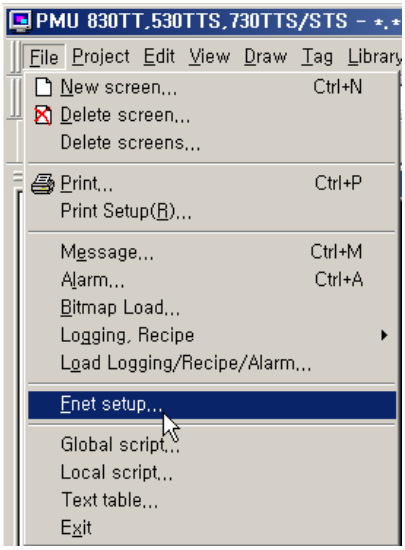
8.1.2 PMU parameter setup

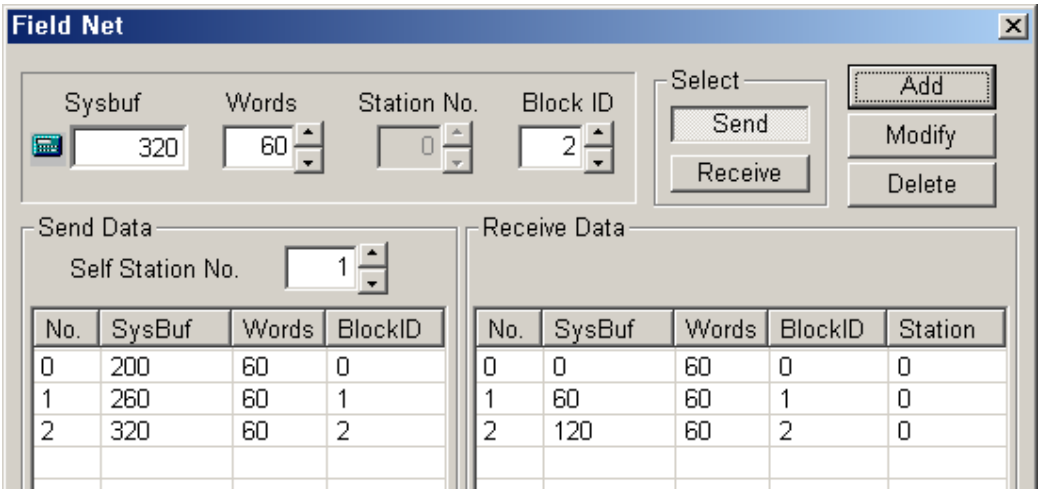
8.1.2.1 Selection of Machine(PMU) type and Fnet.



8.1.2.2 Registration of communication parameter

Click [**Fnet setup**] item in the File menu of PMU-Editor



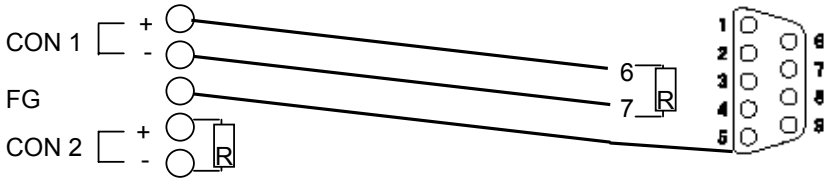


1. Select [Send] or [Receive]
2. Input [System buffer No.], [Words], [Station No.] and [Block ID]
3. Click [Add] or [Modify]

8.2 Rnet Protocol Description

The Rnet is IMO's dedicated fieldbus communication for IMO PLC(G-SERIES GM, K-SERIES), IMO Smart-I/O and HMI devices.

8.2.1 Cable connection

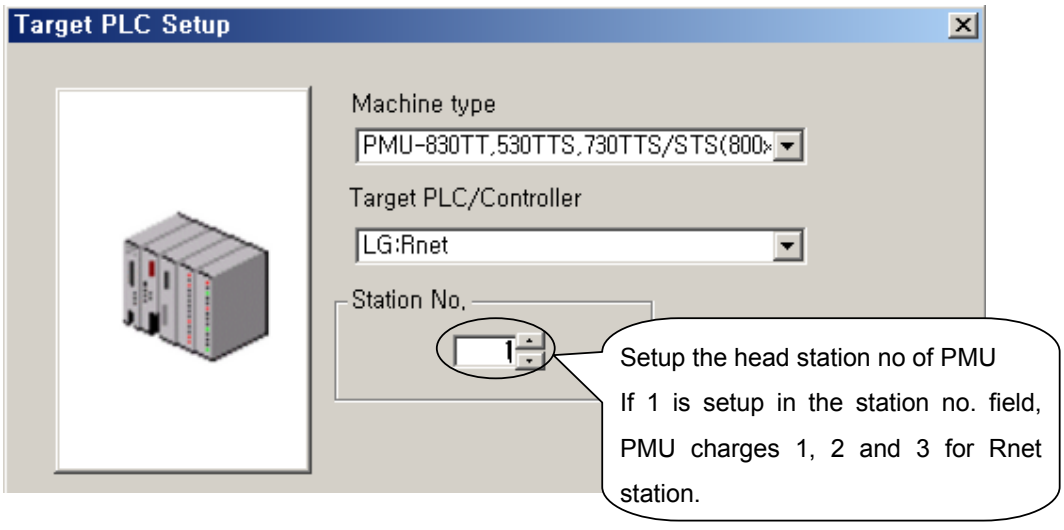


PMO-xxxR GxL-RUEA

R : Termination Resistor(110 Ohms, 1/2 Watt)

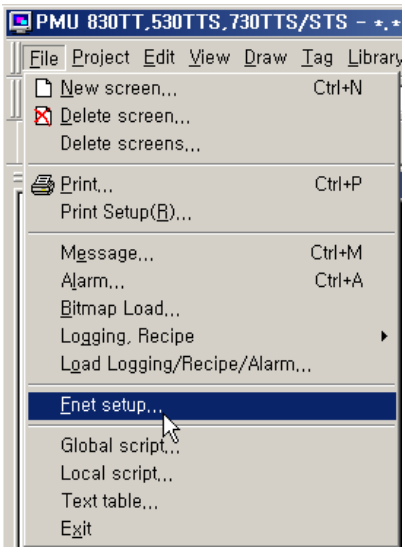
8.2.2 PMU parameter setup

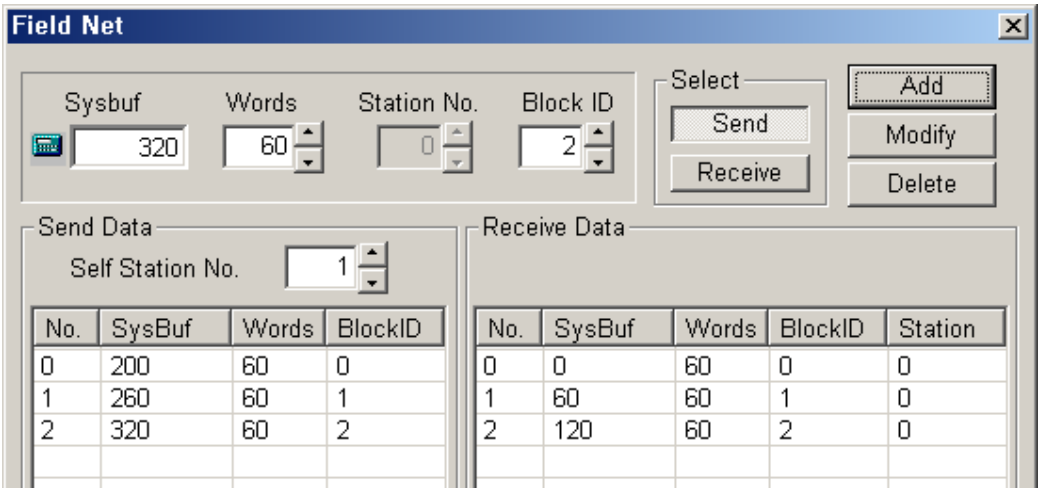
8.2.2.1 Selection of Machine(PMU) type and IMO:Rnet.


Target PLC Setup
Machine type
PMU-830TT,530TTS,730TTS/STS(800
Target PLC/Controller
LG:Rnet
Station No.
1
Setup the head station no of PMU
If 1 is setup in the station no. field, PMU charges 1, 2 and 3 for Rnet station.

8.2.2.2 Registration of communication parameter

Click [**Fnet setup**] item in the File menu of PMU-Editor





1. Select [Send] or [Receive]
2. Input [System buffer No.], [Words], [Station No.] and [Block ID]
3. Click [Add] or [Modify]